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THE
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EUROPEAN CAVALRY.

BY COLONEL KEITH FRASER.

THE recent formation of a dismounted *corps d'élite* composed of officers and men drawn from nineteen regiments of cavalry in the United Kingdom is perhaps the strangest episode in the annals of that arm. Imperious circumstances have compelled the commander-in-chief of the expedition to Khartoum to resort to this expedient in order to obtain the services of a certain number of seasoned soldiers, but we know from Lord Wolseley's writings that he does not in any way share the opinion of some English officers, holding what are termed advanced views, that cavalry will in future be useless on the battle-field, even against disciplined infantry; that the extraordinary improvements in modern firearms, their capacity for rapidity of fire and greatly increased range, will have the effect of confining the duties of cavalry to minor objects and of greatly diminishing its utility. There might be some truth in this theory if battles were fought on perfectly level plains, if smoke, dust, and mist were unknown, or if the sudden appearance of a body of horsemen well closed in on the flank of infantry, exhausted by the fatigue and anxiety of a long conflict, were no longer to have a terrifying effect. Among the military nations of the continent, however, it is recognized that, so far from the time for the efficacious employment of cavalry, either on the battle-field or in enterprises against the flanks or rear of an enemy, being past, a glorious future is dawning for that arm, and that opportunities will arise when well-disciplined, well-trained, and well-commanded cavalry may, through its power of securing for itself comparative immunity from the dangers to which other arms are in a higher ratio exposed, take a leading part in the conflict and perhaps decide the fate of a campaign. Among other high authorities, Field-Marshal Count Moltke has recorded his opinion that because in future the destructive fire of artillery will necessitate a scattered formation, the *rôle* of cavalry will be most important. Greater skill will no doubt be required in handling it so as to bring it into action decisively at the critical moment, *cito parare victoriam*, for only by rapidity in manœuvring can the effect of the breech-loader be paralyzed.

History proves that without cavalry a victory is rarely brilliant. If cavalry is beaten, according to Montecuculi, the battle is entirely lost; if, on the other hand, it is victorious, the victory is complete. From the day when Hasdrubal destroyed the Roman host at Cannæ until that on which, two thousand years afterwards, the British squadrons, charging the flanks of the old guard at Waterloo, "prevented all rallying" after the annihilation of the French cavalry, this axiom has been true. In the last great war cavalry on both sides were on several occasions nobly sacrificed in order to gain time for the infantry, or in heroic effort to avert disasters already irreparable, but neither in the "death rides" of Worth or Réjonville, or in the terrible slaughter of Sedan, were the losses as heavy as those incurred by cavalry in the days of muzzle-loaders. That the effect of the fire of modern weapons, requiring as they do in their use considerable skill and a correct judgment of distance, would be very destructive to cavalry moving rapidly outside the zone of four hundred yards remains to be proved. In a trial which lately took place in India between three Gardner guns and a detachment of sixty picked shots file-firing at six stationary targets at five hundred and eighty-five yards, the distance being unknown, the latter made only twenty-four hits out of four hundred and eleven rounds; and at nine hundred yards volley-firing, the distance being known, only thirty-six hits out of six hundred and thirty rounds. The Gardner guns were even less successful, a result highly encouraging to cavalry.

It is probable that, should war be declared between any of the great states of Europe, several cavalry divisions would be at once pushed to the threatened frontier in order to cover the mobilization and concentration of the armies in their rear. From the first engagements of cavalry and horse artillery on a large scale may be expected, and the question as to which country is to be the theatre of operations will be decided by the rival squadrons. In view of the momentous consequences of success or failure at the outset of a campaign, it is not to be wondered at that a great increase has been gradually taking place in the numbers of cavalry in foreign armies, and that the closest attention has been paid to the organization of that arm and to the tactics to be employed in manœuvring, in accordance with the exigencies of modern warfare, the vast masses that will be brought into the field.

The proportion of cavalry to infantry in European armies is,—

	Cav.		Inf.		Cav.		Inf.
Greece	1	to	3.8	Belgium	1	to	3.5
Germany	1	"	4.5	Austro-Hungary	1	"	3.8
Spain	1	"	4.06	Russia	1	"	4.2
France	1	"	4.4	Portugal	1	"	7.3
Sweden and Norway	1	"	5	England[1]	1	"	7.7
Italy	1	"	7.8	Denmark	1	"	1.28
Holland	1	"	9.3				

The peace establishment of the cavalry of the four great continental powers amounts to no less than two hundred and fifty thousand sabres, which would form the first line in the event of war. Of these, European Russia possesses 80,975; France, 68,733; Germany, 64,699; and Austro-Hungary, 43,993. The experiment of arming the Russian cavalry with long rifles in order that it might act as infantry has been condemned, but all cavalry, including a proportion of men in cuirassier and lancer regiments, are armed with a breech-loading weapon. There exist in all these countries nearly inexhaustible reserves, the youngest classes of which would be recalled to the depots, and after a few weeks of drill and instruction be able to join their regiments to fill up the gaps which increase day by day after the commencement of a campaign. From these also would be drawn the innumerable drivers for the military train, staff orderlies, etc., who would otherwise have to be deducted from the combatant strength of the war squadrons.

Of all nations the Germans may be said to have brought the organization of cavalry to the highest state of perfection. Acting on the principle that to the army in the field at the commencement of a campaign only such bodies should be sent as have existed in time of peace, Germany could, in the event of a war calling forth all her resources, put at once into first line ninety-three regiments of cavalry. These would be supported by one hundred and forty-four squadrons of reserve and the ninety-three depot squadrons of the regiments at the front; in all one hundred and ten thousand sabres. New clothing and saddlery, already fitted, for this large force is kept in store in charge of each squadron commander. Besides the reserves of horses which, bought at two years old, have been maintained in government establishments until of an age for service, large purchases would be made and depots formed at the headquarters of each army corps. Nor would the French cavalry under the same circumstances be much inferior in point of numbers; for the first line would consist of seventy-seven regiments, with a reserve composed of the depot squadrons and of one hundred and forty-eight squadrons of territorial cavalry. In both of these countries the number of horses exceeds three million, which on an emergency could be purchased compulsorily. It is everywhere accepted as a fact that good cavalry cannot be improvised, that bad cavalry is worse than useless, and that as it takes four times as long to make a cavalry as an infantry soldier, a sufficiency of trained men and horses must be maintained in the ranks in time of peace.

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[1] Exclusive of dismounted men, 1 to 11.7.

With regard to the organization of these great numbers of horsemen in bodies admitting of good administration and practical efficiency, although slightly different systems have been adopted in various armies, the principles which have been acted upon have been the same. The division of cavalry, consisting of two or three brigades, is considered in these respects as the largest that can safely be administered and commanded by one officer. Occasions may arise when it may be advisable to concentrate several divisions into a corps of cavalry under one chief (and there are some who think that such a corps, accompanied by a numerous artillery, with mitrailleuses or machine-guns, would be practically invincible); but this could be done at any time. In addition to independent divisions of cavalry, and in order to avoid the evil of their being frittered away on the battle-field, a certain number of regiments are attached, under the title of divisional cavalry, in proportion of from two to four squadrons to each division of infantry. Although the number of brigades in a division or of regiments in a brigade may vary from two to three of each of these units, there has long been a concurrence of opinion that a regiment should on no account consist of less than five or more than eight squadrons, and that one of these squadrons should in war time be constituted a depot to which all recruits, remounts, and reserves should be sent, and which should provide for the necessities of the others. To have less than four squadrons in the field to one at home is considered far too extravagant a system. As the size of the war squadrons cannot, with due regard to tactical efficiency, exceed a certain limit, three of these do not constitute a body strong enough for the duties which a regiment may be ordered to undertake. Even a closer identity of opinion is to be found in the organization of the squadron, the real administrative and tactical unit of cavalry. On all hands it is agreed that the number of horses per squadron should not be less than one hundred and fifty, or more than one hundred and eighty. "Weak squadrons are the ruin of cavalry." They are unable to perform detached duties properly, nor can they act independently on the offensive or defensive. A squadron of less than one hundred horses soon ceases to be one, even, perhaps, before it has met the enemy. Squadrons themselves are divided into four sections, each under its own officer, responsible to the commander for its efficiency in quarters and in the field. These sections are again subdivided, so that the non-commissioned officers may keep a close and helpful supervision over each soldier.

"Tactics," Napoleon has told us, "alone give us the means of aiming at great results, are more necessary to cavalry than to infantry, and must be changed every ten years if we wish to remain the victors." The most subtle workman, deprived of an easily-managed tool, is capable of little, and there is no doubt that the leaders of cavalry before that change was made had been seriously hampered by the stiff and unwieldy formations in which that arm was called upon to manœuvre and to fight, until General von Edelsheim in 1864 introduced into the Austrian cavalry a method of drill which created a complete revolution in the tactics of that arm, which met with much opposition, but which finally has since been adopted by every military nation in Europe. In the Prussian army, especially ever since the close of the war in 1815, in which the cavalry, notwithstanding its devotion, had had constantly to give way to the French, owing to its having been placed under the command of infantry generals, who used it simply as an auxiliary of their own arm, the absolute necessity of having some fixed rules, which should become second nature to the troops, had been admitted, and the subject of regulating the formation and tactics of large bodies of cavalry had been under the consideration of the most distinguished soldiers of that arm. But it was not till 1872 that a system was approved of by the Emperor of Germany, which, with a few modifications, has now been everywhere accepted as the basis for the manœuvres of cavalry. The principles of this system are those of the great king, the master of the art, whose cavalry, more formidable by its rapidity and discipline than by its bravery, was acknowledged even by his enemies to be the best in the world,—the formations, those practically created by him, which his pupils Ziethen and the incomparable Seidlitz had profited by, but which had during the first years of this century fallen into disuse.

The most perfect training would indeed avail little if there were no cohesion between the different arms, if they were not accustomed to work together, or if no opportunities were afforded to commanders for handling their troops independently or in combination with others. The custom of holding autumn manœuvres, to which during the intervals of peace Frederick the Great attached so much importance, were reintroduced in 1821 into the Prussian army, and have been carried on with little intermission since. Other countries have followed the example, and throughout the continent cavalry are assembled in brigades or divisions for a few weeks in the autumn after the recruits of the year before have passed into the ranks. Regiments thus became accustomed to work together and to know their neighbors, which keeps up that spirit of comradeship so necessary on service. They learn to have confidence in themselves and in each other, and a valuable opportunity is afforded to their leaders of becoming acquainted with those under their command.

We have seen the state of preparation for war in which the great powers of the continent think it necessary to maintain their cavalry in time of peace. Compare with this the condition of the cavalry of this country! Insignificant in point of numbers, "it is," to quote the words of a recent article in the *Times*, "so organized that not a single regiment can be sent into the field at its prescribed strength, or maintained at that strength." Nor is this a new state of things. All through the Peninsular War the dispatches of the Duke of Wellington teem with complaints of his want of cavalry. After Salamanca the want of sufficient cavalry prevented the pursuit and destruction of Marmont's army; at Vimiera he attributed his losses to the superiority of the enemy in cavalry; the great risk he ran at the passage of the Douro was due to his weakness in that arm. Before Waterloo he had won many battles, but had never been able to destroy his enemy from the same cause. Even at that battle, when one-fourth of his army consisted of cavalry, he was obliged to leave the pursuit to the squadrons of Ziethen. And yet in those great days the country possessed a comparatively large force of mounted troops. But the lessons of the war were forgotten in the long peace, and the army which embarked for the Crimea took with it a mere handful of cavalry, only one-twelfth of its whole strength. After the battle of the Alma that little force was unable to follow up the success which the infantry had so gallantly obtained, and Sevastopol was saved. The victory was not complete. A few weeks subsequently, after having on one day only met the enemy in fight, our cavalry, called upon to do work far beyond its powers, became a nonentity, one of its two brigades, composed of five so-called regiments of hussars, lancers, and light dragoons, being able to turn out altogether *one* weak squadron. No valid reinforcement could be dispatched from England, and in the second year of the war our cavalry, with the exception of two magnificent regiments from India, consisted of raw recruits of all ages hastily enlisted, who, after a few weeks in the riding-school, were sent out to complete their education before the enemy in the campaign in the field which then appeared imminent. In order to obtain trained soldiers, Europe was scoured for adventurers who had served in foreign cavalry. These men, supplied with English uniforms, were formed into regiments, and had it not been for the cessation of hostilities would have been employed in the destruction of soldiers of a nation with which their own governments were at peace.

If another great war were to come upon us should we now be in a better plight? Who would have the temerity to answer such a question in the affirmative?

The total number of British cavalry which England, famous for good riders and for her breed of horses, possesses for the defense of her interests all over the world, is 15,956 men and 10,899 horses. Yet the demands upon our cavalry are far heavier than on that of any other country, for it must be in constant readiness to embark at the shortest notice for the most distant lands. At this moment from the north to the south of Hindostan, in the warlike capital of Oude, at the gates of the turbulent city of the Nizam, or on the watch over the native armies of the great Mahratta chiefs, and in Egypt and Natal, English cavalry regiments are stationed.

The British cavalry is composed of thirty-one regiments, divided, with the exception of the household cavalry, into heavy, medium, and light. Little difference exists in the weights—which compare favorably with those of foreign cavalry—of these various descriptions, as the accoutrements and equipments are practically the same; in fact, a few years ago the men of the heavy cavalry were found to ride lighter than those of the light. All are mounted on the same class of horse except regiments in India, which are mounted on Australian horses. There are three regiments of household cavalry, five of lancers, ten of dragoon guards and dragoons, and thirteen of hussars. Nine of these regiments are on the Indian establishment, one is in Egypt, another in Natal. Of the remaining twenty, the household brigade consists of 1221 men and 825 horses; thirteen regiments of the line have each 469 men and

300 horses, and four have 601 men and 400 horses, making a total in the United Kingdom, after deducting the men of the recently-formed dismounted composite regiment, of 9034 men and 6325 horses. Five of these regiments are stationed in Ireland, leaving the strength of the cavalry in Great Britain available for foreign service (for it would probably be impossible to withdraw troops at present from Ireland, Egypt, or Natal) at 6739 men and 4325 horses. From the former number must be deducted about sixteen per cent. of recruits and thirty per cent. of horses too old or too young for service, and those required for mounting infantry officers, chaplains, surgeons, military police, signalers, and for the numerous duties which in continental armies are provided for in times of peace. The strength of a British army corps on a war footing is, exclusive of officers, 35,682, of which 3780 men, with 3144 horses, are cavalry. It is evident that, by taking every available animal, it would be barely possible to supply a sufficiency of horses for the cavalry of one such corps. There is no reserve of horses.

Army corps, divisions, and brigades exist only on paper. Regiments on the British establishment are composed of eight troops, the troops being the administrative, while the squadron is the tactical unit in our system of organization. As two troops form a squadron, there are only four of the latter in each regiment. Troops are not subdivided. The number of horses per squadron fit for active service varies from fifty to seventy. A regiment has two lieutenant-colonels, three majors, five captains, eleven lieutenants, an adjutant, and a riding-master. The lieutenant-colonels divide six years of command between them, the longest period being limited to four years. It follows, therefore, that one of these officers holds the command for two years only. Nothing can be more injurious to the discipline of a body of men than this constant change. It takes time for an officer to know thoroughly the character of those whom he commands, and it is in cavalry especially, where the condition of the horses, and consequent efficiency of the regiments, depends so much on the good-will of all ranks, necessary that a mutual acquaintance, and even friendship, should exist between a commanding officer and his men. Even if slightly quicker promotion is obtained, which is very doubtful, it would appear to be a most wasteful system to remove from so important a post, perhaps on service before the enemy, a man who has proved himself fitted for it, and to keep him in idleness, in order to replace him by another whose capabilities remain to be proved.

Majors and captains command troops. The former rank has been introduced to mitigate the evil of a recent regulation, under which an officer who has not risen above the rank of captain is compulsorily retired after twenty years' service. Not only are there five superior officers in each regiment, but even that number is increased by the brevet promotions now so lavishly bestowed, especially on staff officers. The number of field officers in our cavalry is one hundred and seventy-one; in the ninety-three regiments of German cavalry, where that rank is highly esteemed, it is less than two hundred; but military titles in the English service convey no idea of an officer's regimental position. An officer returning to the command of his troop after perhaps many years' absence on the staff may find himself, owing to his brevet rank, in command of a brigade with his own commanding officer under his orders, and such anomalies have occurred. Exchanges between cavalry and infantry being permitted, the officer so placed may not have served the apprenticeship so necessary in cavalry, and without which no man is fitted for high command of what the Duke of Wellington described as "the most delicate of all arms." In foreign armies, when exchanges or transfers from one arm to another are never allowed above the rank of lieutenant, and very rarely then, such a system would be looked upon not only as subversive of all discipline but as sure to lead to disaster. The adoption of the system which obtains in some armies of making staff officers return occasionally to regimental duty would be most beneficial, and would probably conduce to promotion by the retirement of those to whom such work is disagreeable.

Lieutenants are distributed among the troops. What with vacant commissions and officers at drill or absent attending the numerous courses of instruction necessitated by their ignorance of matters connected with their profession on entering the service, there are rarely as many as one per troop available for duty. In fact, troops are frequently commanded in the field by non-commissioned officers even in peace time. Difficulties have arisen of late in finding a sufficiency of candidates for our small force of cavalry. This has been attributed by those persons who wish to abolish that excellent institution, the officers' mess, to the supposed heavy social expenses entailed by it (as if officers could possibly live more cheaply at clubs, hotels, or eating-houses), and the senior officers, usually the poorest class, have been blamed for this. In old days the expenses were far greater than now, when the strictest economy prevails, yet there was always a superabundance of applicants for commissions. Unfortunately, many young men admirably suited for the profession, accustomed to riding and to out-of-door life, educated in the healthy atmosphere of our public schools, and with sufficient means to enable them to support the compulsory expenses of the service, find themselves beaten in the race of competitive examination by lads whose lives have been spent in cramming, and who are therefore better up in the special subjects of examination. A knowledge of economic physical geometry, or the power of writing essays on such topics as the "Water Supply of London," or a "Visit of Sir Roger de Coverley to Lord's Cricket-Ground," would not in other countries be considered as qualifications for a cavalry officer, but the want of them has proved fatal to many an otherwise eligible candidate. The training of the recruits, who in foreign cavalry all join on the same date, is in our army carried out by the adjutant and riding-master, officers specially selected for their capability of imparting instruction. It is not every one, however conversant he may be with a subject, who has the gift of being able to teach it. If our system is to be changed, and squadron officers are to perform this duty, we must expect far less individual proficiency in the soldier, and exchanges from infantry could not possibly be permitted.

The non-commissioned officers are an excellent, well-educated body of men. Besides being good horsemen, they are taught to shoot, fence, sketch, read maps, make intelligent reports, and to understand signaling and many other accomplishments. It is greatly to be regretted that on discharge they should have no claim, as in other countries, to employment by the state, and that public situations now usually filled by superannuated servants of members of Parliament should not be retained by them. It is melancholy to see an old and worthy non-commissioned officer seeking in vain for some humble employment. Although the work in the cavalry is infinitely harder than that in the infantry, there is no difficulty in obtaining for the former respectable recruits who present a strong contrast in appearance to those enlisted for the latter. It would tend to make the service more popular if non-commissioned officers and well-conducted men, especially of the cavalry, who enlist for longer periods than the infantry, serving abroad, were allowed occasionally passages to England on furlough, and would be more economical and less injurious to the soldier than the present system of giving enormous bounties to men to re-engage abroad.

All our cavalry are armed with the sword and Martini-Henry carbine, a weapon with which the greatest accuracy can be obtained up to six hundred yards. The objections to the long rifle, owing to the difficulty of carrying it, have proved insuperable. It has been proposed that only when in close proximity to the enemy the carbine should be slung on the man's back in case he should lose his horse, and that the sword should be hung on the saddle when the men are acting on foot. It is to be hoped that revolvers, which are far more dangerous to friend than foe in a charge, will never be supplied to our private dragoons. Opinions will always differ as to the value of the lance, which has now been discarded in France and Austria. It is said that the only French cavalry Wellington's infantry feared were the lancers. Whatever its merits or demerits may be, it might be desirable to temporarily arm all our cavalry with that weapon (which each man is taught to use) when about to be employed against undisciplined warriors, armed only with spear and shield, who probably lie down when charged.

Horses are purchased at three and four years old, and are sent to the ranks as soon as trained. The system of not working horses in the field until they are six or seven years old could not be carried out in our skeleton squadrons. About thirty per cent. of horses in the mounted branches are either too young or too old to be sent on service. In no other army is so much care paid to the fitting of saddlery and equipment, or to condition and shoeing of the horses. Officers are blamed sometimes for attaching too much importance to such details, and to be therefore unfit for higher things; but we have been told by the greatest cavalry leader that ever lived that knowledge of such details is the "first step on the path of victory." No daring or brilliancy on the part of a commander can compensate for sore backs and girth-galls, or heels cut with the picket-rope, or for the want of spare shoes, for a horse once unserviceable remains so generally during a campaign.

Brigade tactics have at last been assimilated to those in use on the continent, but the weakness of our squadrons still renders the total abolition of the old pivot system of drill for bodies smaller than a squadron impossible. Few indeed are the opportunities afforded to commanding officers for the practical instruction of their officers and men in tactics, or in detached duties at a distance from the parade-ground, in which cavalry ought to be perfect. At Aldershot and the Curragh it is true that much benefit is derived from the assembling of regiments, but in other places the greatest difficulties are encountered. The large manœuvring-ground which exists in the vicinity of every garrison town on the continent is in England considered unnecessary. We know that without elbow-room cavalry is useless, and yet our regiments have to be trained in the most confined spaces, and all the knowledge they obtain before going on service, unless they have been stationed in India, of their most important duties, such as keeping touch of the enemy and making reconnoissances, is purely theoretical. Yet there are large open spaces and wide-spreading downs admirably adapted for manœuvres. The assembling of a force of cavalry and horse-artillery annually would be of inestimable value, not only for testing the capabilities of the commanders, but for proving the value of the lessons learned in the instruction-room.

The good services rendered by mounted infantry in South Africa have attracted much notice to that subject. There can be no doubt that against uncivilized enemies they are of infinite value, and under all circumstances it would be a great advantage to be able to move a body of infantry as rapidly as cavalry. In civilized countries, however, where there are good roads, it is not difficult to carry infantry in light carts, which was frequently done by the Germans in the late war with France, or cars which could carry men whose horses were disabled (and horses fail far quicker than men), and which could go wherever a gun could go, might be made use of. The idea of having a separate corps is scouted in foreign armies. It is thought that it would soon become a species of bad cavalry and indifferent infantry, or bad infantry and indifferent cavalry. In countries where horses or ponies abound, such a force can easily be raised among the adventurous spirits, of whom there are always plenty, officers and men, ready to volunteer for a service which offers so many elements of danger. It must be remembered that the horses of mounted infantry require feeding as much as cavalry, and this would necessitate an increase of transport, with which an English army is never too well provided. That our cavalry can do well as mounted infantry was exemplified by the Tenth Hussars in the Soudan. In any case it would be, with our cavalry in our present condition, premature to think of raising a new kind of mounted force.

If proof were required of the insufficiency of our cavalry, even for a little war, what occurred when a brigade and a regiment of divisional cavalry were ordered to Egypt in 1882 would amply afford it. There was no difficulty in sending out so small a body as three squadrons of the household brigade, but the three line regiments were found to be of themselves quite unfit for service, being in want of officers, men, and horses. These had to be taken from the remainder of the cavalry. No less than twenty-eight officers, including four captains of troops, were taken from their duties and attached to the regiments for service, one of which had actually to borrow three captains and eleven subalterns. Indeed, so great was the stress for officers during the campaign that the services of some gentlemen traveling in Egypt, who had formerly been in the army, were greedily accepted by the authorities. Volunteers to fill the ranks were called for from all quarters, and the deficiency in horses was met by taking almost all the trained animals fit for service in Great Britain. From one regiment alone two hundred horses were drawn. In the first reinforcement of men sent out no less than twenty-one regiments were represented. It may indeed well be asked, "How could discipline and duty have been carried out in regiments so denuded, and what would have happened had they also been compelled to go on service?" For the regiments sent abroad, what could have been worse than flooding them with officers, men, and horses who had never met before the day of embarkation in their lives? All were new to each other,—regiments, leaders, staff, regimental officers, non-commissioned officers, men, and horses. The success attained by the cavalry obtained deserved credit; but to send a force so constituted against an enemy possessing well-trained and well-officered cavalry, accustomed to work together, would be a dangerous experiment.

The question as to how the present state of affairs is to be remedied has long exercised the minds of military men. Numerous schemes have been proposed, and War Office committees have considered plans submitted to them for the reorganization of the cavalry, but all these have been based on the idea that an increase of men or horses must be avoided at all hazards. Yet it is simply the want of numbers that renders our present organization defective. The system adopted in the infantry of linking two regiments together, assimilating their uniforms, and making all ranks interchangeable, would give no increase of strength whatever. To keep nine regiments at home as feeders for the same number in India would be to act on the assumption that danger was only possible in that part of the empire. This expedient would only leave ten regiments of the line for European service, viz.: five for the first line and five as links to supply their wants, for if the regiments linked to those in India were to be sent abroad, the whole system would break down. The extravagance of keeping a whole regiment in an efficient state, merely to train men and horses for another when this could be done by one squadron, is apparent. Even the desperate expedient of disbanding some of our small number of regiments, in order to increase the strength of the remainder, would be preferable to this scheme.

It is now eleven years since General, then Colonel, Valentine Baker, in a lecture delivered at the United Service Institution, vainly urged the imperative necessity of increasing the strength of our cavalry regiments in peace time to seven hundred and fifty men, of maintaining constantly a sufficient number of horses, and of establishing a system of reserves of the latter which could be easily drawn upon if wanted. The late Inspector-General of Cavalry, Sir Frederick Fitzwygran, has recently brought the subject prominently before the House of Commons, and pointed out the advisability of increasing the number of squadrons in a regiment to five; but the small interest now shown by members of Parliament to military questions not of a party nature affords little hope that, unless his views are adopted by the government, his words will have little effect. If the proposals of the two above-named officers, who thoroughly know the wants of the English cavalry, were adopted, and if the nineteen regiments of the line, not subject to Indian regulations (although the latter as urgently require augmentation) were raised to five squadrons of one hundred and fifty men and one hundred and twenty horses, the proportion of cavalry to infantry, of which we possess eighty-three thousand, exclusive of those in India, would be as 1 to 6 only. Even if twelve regiments were so maintained, and the remaining seven were augmented to five squadrons of one hundred and thirty men and one hundred horses, two army corps could be sent on service complete in cavalry, supported by a second line of trained soldiers, whilst the depot squadrons assembled at large stations would supply the wants of those in the field and remain at home as the last reserve.

The regiments of household cavalry, whose value was admitted even by the most hostile military critics during the Egyptian campaign, and whose duties during peace, owing to the smallness of the number of men, are far heavier than those performed by any other cavalry in Europe, might also advantageously be raised to six hundred and fifty men, but the limited barrack accommodation in the vicinity of London would probably prevent any large increase in the number of horses. Nor would the expense—that consideration to which the efficiency of our army has so often been sacrificed—be so great as might at first sight be supposed; for increased numbers would permit of the adoption of the much-to-be-desired squadron system, under which the present staff and non-commissioned officers would suffice for a regiment of five squadrons. The augmentation, with the exception of the officers for the fifth squadron, would be confined to the horses and the private soldier, whose pay is very little more than that of the infantry. The standard of education being much higher and the ratio of crime far lower in the former than in the latter, as proved by the annual army returns, it is a question whether it would not be more economical to have more cavalry men and less infantry.

It has frequently been suggested that a closer connection should be drawn between the regular and the yeomanry cavalry, in order that horses, after being trained, might be kept by the latter until required for war purposes. A system might also be organized, under which persons willing to register their horses as available for the public service at a fixed price in case of war should receive periodically a small sum, provided the quality and condition of the animals was satisfactory. Whether either of these schemes is feasible or not, it would be most desirable that the whereabouts of horses fit for the cavalry should be known, and also the number existing in the country. Even during the short campaign of 1882 the greatest difficulty was experienced in finding horses of the right stamp, and these had to be sent out quite untrained, many of them never having had a bit in their mouths.

Until the cavalry is in a proper state it is useless to assert that the English army is in a perfect state of efficiency. No army can be so if one branch of it is not. "That the whole machine may work properly each spring must be finished with the same care," was said by the great Frederick in relation to the army. The commander-in-chief is reported to have stated lately in public that the army was insufficient in point of numbers for the duties imposed upon it. To no portion of the army could the words apply more strongly than to the cavalry. The responsibility rests on those who, no matter to which political party they have belonged, have, to avoid the odium of increased expenditure, left to their successors in office the difficulty of solving the problem. But surely the House of Commons, which willingly accepted the enormous cost of the abolition of the purchase system, under the belief that thereby the army would be rendered efficient, and who have this year voted more than three millions for "non-effective" services, would not refuse the comparatively insignificant sum which would render one branch of it "effective."

The British cavalry has proved on many a battle-field what can be accomplished by courage, order, and discipline. When it has failed it has been due to faults more pardonable in that arm than in others,—to reckless leading against overwhelming odds, to the ardor of pursuit, or to the contempt of tactics. It yields to no other in the proud record of its achievements. Well disciplined, well trained, and well mounted, perfect in *personnel* and *matériel*, imbued with the best spirit, it cannot be denied that, owing to the paucity of its numbers and consequent weakness of its component parts, and to the absence of reserves, it is, for a European campaign, perfectly inefficient.

That something must be done, and that quickly, is the opinion of all those who love their profession and have its interest at heart. The "clouds in the East" are still lowering. Who knows when and where the storm may burst, or how soon the words of Lord Wolseley may be applied to ourselves, "Alas! for the army that is weak in cavalry"?

THE BRITISH NAVY.

BY SIR E. J. REED, M.P.

THE condition of the navy has at length become a question of recognized public importance, competing in interest even with the startling usurpation lately attempted by the House of Lords. The popular interest in the navy, naturally enough, turns primarily upon our acknowledged deficiency as regards the numbers of our ironclads; but there are other parts of the subject which, to say the least, are fully as important as the length of our list of ships. Notwithstanding the very good service which has been rendered by the press, and primarily by the courageous action of the *Pall Mall Gazette*, it seems doubtful whether the true character of the naval problem has yet been at all thoroughly considered. The unblushing boldness with which the multiplication of unarmored ships for war purposes is advocated, seems to indicate that the causes which brought about the employment of armor in the navy are being lost sight of, and, if we are not very careful, we may be forced into an expenditure of several millions sterling, and then find our last state but little better than our present.

Down even to our own day, naval battles were fought in wooden ships, armed with guns firing solid, and therefore unexplosive shot. A limited use of explosive-shell-fire from mortars had been made in the navy for some years before; but the destructive efficiency of explosive projectiles fired from ordinary guns was dramatically demonstrated by the Russian fleet in the Black Sea, late in 1853; and, as Sir Thomas Brassey states in his work on the navy, "The massacre of the Turks at Sinope, occurring at a moment when the public feeling of several powerful nations was strongly directed towards war, attracted special attention, and revealed very plainly to all that the shell guns with which Russia and most Western states had armed their fleets, had rendered the abandonment of wooden hulls inevitable." Here Sir Thomas Brassey puts the case as if shell-fire had proved the unfitness of the wooden hull only; and it was natural enough to put the case so, seeing that all the ships destroyed at Sinope were of wood. But Sir Thomas immediately, and very properly, goes on to tell us that the effect of the Sinope disaster was not merely to substitute iron for wood in the construction of the hull of war-ships; but to protect the ship, whether of wood or of iron, with armor-plates. Sir Thomas further shows that in this country, where, as he says, "grave doubts have been felt as to the utility of armor," not only did we forthwith resort to iron as the material of the hull of the "Warrior," but we were at least compelled to adopt armor itself as a means of excluding explosive shells from the interiors of our ships.

This compulsory adoption of armor, as well as of an iron hull, is a matter of the greatest possible importance and significance. The present condition and the future development of our naval power can only be properly understood by those who keep it clearly and carefully in mind. In fact, I doubt if there be any other question before the public at the present moment, in dealing with which it is so necessary to keep its recent history well in view. It will therefore be worth while to look back a little at our own experience.

And, first, let us briefly notice what happened in our own experience with shell-guns and unarmored ships in actual war. We have not—it is gratifying, in most respects, to know—had many opportunities of witnessing the results of naval engagements since the general introduction of shell-fire; but the attack made by our fleets upon the forts at Sevastopol in October, 1854, furnished a sufficient illustration for our purpose. Of the "Arethusa," Mr. Kinglake says, "Four shells took effect on board of her; and she was set fire to both on her main and her lower decks." Of the "Albion" he says, "She was soon struck by numbers of shells. Of these some struck the ship near her water-line, and some of them, bursting on the orlop-deck, set fire to the ship in several places. In her masts, in her rigging, and in the part of her hull near the water-line, the ship suffered havoc, and the fires which laid hold upon her having rendered it necessary to close the magazine, her broadside was by consequence silenced. . . . Nearly half of the 'Albion's' crew were mustered at 'fire quarters' to get down the three conflagrations which threatened the powder-magazines." The "Bellerophon" was set on fire by a shell; altogether she was three times on fire. The "Rodney" "was set fire to both in her orlop-deck and in her foremast under the foreyard." And again, "Both the 'Rodney' and the 'Spiteful' sustained a good deal of damage from shot and shell." "The 'Agamemnon' was set on fire by a shell;" and so on. "The 'Ville de Paris,' the French admiral's flag-ship, received fifty shots in her hull; and a shell bursting under the poop made such havoc in that part of the ship that nine officers of Hamelin's staff there standing near their chief were either killed or wounded."

The foregoing example will do as well as any other for the purpose of illustrating the effects of shell-fire, since it cannot matter whether the shell enter the ship from a land battery or from a ship's battery in so far as these effects are concerned. In the case of the English ships, nearly all the mischief worked upon them appears to have resulted from a single gun in the Wasp Battery, and five guns in the Telegraph Battery. These six guns were ridiculously small and weak, as compared with the guns now carried in all descriptions of war-ships, although they were well placed at an elevation. But the important point to be observed is, that this shell-fire had, when employed against unarmored ships, most destructive effects. It must not be thought that these effects were wholly due, or due in the main, to the fact of the sides of our ships of that day being constructed of wood. No doubt such shell as lodged in the wooden sides and exploded there occasionally set fire to the hull itself; but it is obvious from the language of Mr. Kinglake, above quoted, that it was between decks where the worst ravages occurred, and where the most dangerous fires broke out.

It follows from this that, whether the hull proper be of wood or of iron, shell penetrating into the interiors of ships inflict havoc, and that he who exclaimed, "For God's sake keep out the shells!" did so with good cause. It would be perfectly possible for iron or steel vesself, if unprotected with armor, to suffer from fire to nearly the same extent as the ships before Sevastopol, even from the same comparatively trifling attack, were they in all other respects like them. Indeed, there is very good reason for believing that, had the navy of that day consisted of unarmored iron ships, they would have suffered a great deal more, and probably several of them would have gone down, for the reason that, in addition to the injuries already described, they would have suffered others, due to the fact that the holes and rents made by projectiles in the sides of iron or steel vessels are often both far larger (especially those on the off-side caused by projectiles that have passed through the ship) than those made in wooden ships, and far more difficult to repair. The "Arethusa" and "Albion" were sent to Constantinople to repair and refit, and, says Kinglake, "they were in such plight that the chance of their proving able to reach the Bosphorus was judged to be dependent upon weather." Considering the very great facilities that exist on board ship for temporarily repairing injuries to wooden planks, and the few that exist there for temporarily repairing iron plates, the probabilities are that, had their hulls consisted of iron or steel (not armor, of course), they would never have crossed the Black Sea at all.

We have, therefore, to consider the condition of our navy in view of these facts, and also in view of the terrible increase in the power of the gun and of the shell, to say nothing at this point of the torpedo or the ram. In the first place, it will be well to take note of these circumstances which tend, in the modern unarmored war-ship, to diminish the disastrous effects of shell-fire. It may be roundly stated that the war-ships which we now construct are all built with hulls of steel, and most of them are built with decks of steel,—the steel decks, however, being for the larger part covered with deck-plank of teak or of pine. The ribs, and the beams, and all the outside plating, are of steel. Further, a great many bulkheads, also of steel, are fitted in all war-vessels, most of them extending transversely from side to side of the ship, and some of them running longitudinally. All magazines, rooms for explosive shells, torpedo-rooms, etc., are situated in close compartments of thin steel. By all this—excepting the wood covering of most of the decks—fireproof qualities are in a considerable degree provided. Iron decks overhead, and the iron bulkheads of cabins, however, condense moisture so rapidly that it is neither comfortable nor safe, in a sanitary sense, to have them uncovered. Formerly, they had all to be sheathed with wood, which is always more or less combustible, and ordinary cabin bulkhead stuff is exceedingly so. To mitigate this, great pains have been taken by the Admiralty Staff, under the direction of Mr. Barnaby, to find other much less combustible materials for this purpose, and compositions of different kinds have been employed, often with great success and advantage. Experiments with this object in view are still proceeding. All this must be fully understood and allowed for by those who would understand the characteristic of the war-ship, whether armored or unarmored, as she now exists. But when every such allowance has been made, it must candidly be acknowledged that in the furniture and stores of a war-ship, in the bedding and clothing of its crew, etc., large quantities of combustible matter still remain, and are readily consumable by shell-fire, their burning involving the ship in the risk of destruction.

Let us next compare the nature of the shell-fire which our ships encountered at Sevastopol with the shell-fire which we have to encounter afloat now. The largest guns mentioned in Mr. Kinglake's statement of the armament of the Russian sea-fort batteries which were attacked were 32-pounders. In his evidence, given before the National Defense Commission in 1859, the late Captain Cowper Coles, R.N. (who was a flag-lieutenant at the bombardment of Sevastopol), also stated that the guns fired at our ships were 32-pounders, which he believed "were a trifle larger than ours." On being asked if those were the largest, he replied, "Those at Wasp Fort, I imagine, were 68-pounders." Now let us bring into one view the particulars of these guns, and of the shell fired by them, together with those of a few modern guns, such as are now carried to sea by ships of war. I omit, from the following examples (which have chiefly been taken from Sir Thomas Brassey's lists), several improved guns which are much more powerful for their weight than many of these, because I wish to avoid all straining of statement; and for the same reason I omit likewise all such exceptional cases as the 80-ton guns of the "Inflexible," the 100-ton guns of the Italian ships, the 107-ton guns of Herr Krupp's manufacture, and the 110-ton guns of the "Benbow." The guns which are recorded in this table represent armaments that are quite common in the armored ships of our own and other countries:

LARGE NAVAL GUNS OF 1854.

Description of gun.	Length of gun.	Weight of gun.	Weight of projectile.	Charge of powder in gun.	Bursting charge of powder in shell.
	Feet.	*Tons.*	*Pounds.*	*Pounds.*	*Pounds.*
32-pounder	9½	2½	32	10 (maximum)	1
68-pounder	10	4¾	68	16	5½

PRESENT LARGE NAVAL GUNS (EXCLUSIVE OF THOSE OF 80, 100, AND 110 TONS).

Description of gun.	Length of gun.	Weight of gun.	Weight of projectile.	Charge of powder in gun.	Bursting charge of powder in shell.
	Feet.	*Tons.*	*Pounds.*	*Pounds.*	*Pounds.*
English	15	18	400	70	20¼
	15¼	25	600	85	37¾
	19	38	802	130	30
French	16¼	15½	317	61½	17
	17¾	23	475	92½	24
	22	38½	770	132	37½
Austrian	18¾	22½	395	70½	20¼
	20	27	559	121	25¼
Russian	18¼	28	495	82½	18½
	20¾	40	649	121	16
German	20	28	561	132	25
	22	36	715	158	22

A glance at the above figures will suffice to show that (even omitting all naval guns of eighty tons and upwards, as is there done) the guns and projectiles of to-day are out of all proportion greater than the guns of 1854 in offensive power. Neglecting for the moment the Wasp Battery (which employed but a single gun, and accomplished but little),[1] the damage which our ships sustained at Sevastopol was inflicted entirely by projectiles fired with 10-pound charges, and with a single pound of powder, each, as a bursting-charge. And now the question which I wish to put, and to have considered, is this: If shell, charged with one pound of powder, each bursting between the decks of ships, wrought all the injuries and losses which we sustained at Sevastopol, what are the injuries and losses to be anticipated when between our decks we have shell bursting charged each with twenty pounds, thirty pounds, and nearly forty pounds of powder?

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[1] It was supposed at the time that the battery which the English named "The Wasp," worked much of the havoc upon our ships; but later information proved

This question has to be put and considered, let it be observed, not in relation to our armored ships only,—or I should have dealt with less powerful guns,—but with reference to our armored ships likewise; for the answer given to it should, in my judgment, have a very important influence indeed upon the construction of our armored ships, and of all classes of them. It seems to me that the effects of large modern shell bursting in the unarmored parts of any or all of our ironclads—for they all, or nearly all, have large unarmored parts—may be very much more serious than has yet been realized, and I cannot help regretting that the experiments of the Admiralty have not been more directed to the settlement of this question.

Let it not be supposed for a moment that in these remarks, or in any others which I may offer in this article, I am drawing distinctions between Admiralty ships of my own design and those which have succeeded them. That phase of the subject has but little interest for me, because I have never accustomed myself to deal with this great, this vastly-important subject from any personal point of view; and in the present case, although there may be different degrees of risk in armor-belted vessels and the others, the whole of our armor-clad ships are more or less open to the question that I am here putting and pressing. I may say this, however, in support of my argument, that I never cease to be haunted with the fear that, in the absence of satisfactory experiments, so arranged as to clear up the doubt, we may all be underrating—and very seriously and gravely underrating—the result of the bursting of explosive shells in the unprotected and more or less inflammatory portions of ironclad ships. This is no doubt a danger which

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that this was not the case, and that it was the Telegraph Battery that accomplished it. The Russians allege that although there were eight guns mounted upon it, there was room to work but one at a time, and that it was mainly with one gun that, from the beginning to the end of the war, it kept alive the attention of our seamen. Mr. Kinglake writes: "Perhaps, indeed, one may say of the Telegraph Battery that it alone wrought so great havoc in the ships which came under her guns," *i.e.*, the guns of the Wasp and Telegraph Batteries.

our navy shares in common with all the other ironclad navies in the world, speaking generally. Exceptional ships, with complete armor, are to be found here and there, but in nearly all such exceptional cases—probably in quite all of them—the armor is thin, and itself pervious to such shells as we are considering.

Nor is the question of the effects of the shell-fire upon the unarmored parts of ironclads limited to that of the mischief which may follow the setting on fire of those parts. There is the further mischief—already briefly touched upon—of the bursting through of the thin decks and sides by the blows or the explosion of shells. Who shall say what will be the consequences of shot and shell, weighing some hundred-weights each, and fired with half a hundred-weight or a hundred-weight of powder, tearing through the sides and decks of vessels, or of some of them bursting between decks with twenty or thirty pounds of powder exploding at each discharge? We have but little information to guide us, but we have some; and that little, I admit, encourages us to hope that shell may burst on board modern iron war-vessels without readily igniting their contents. In the successful attack of the two Chilian ironclads upon the "Huascar," one of their shells burst in the "Huascar's" port cabins, another in her wardroom, a third in the pantry, a fourth in the carpenter's cabin, and a fifth in the turret, and either the ship was not set on fire, or the fire was such as was readily extinguished. So far as taking fire is concerned, therefore, this piece of evidence is encouraging, as I have said; but it would not be safe to draw any large inferences until we know all about the fuses, powder-charges, etc. As to the other effects of shot and shell from the 12-ton guns of the Chilian ships, the effects were much less encouraging, for one shell carried away two beams and killed all the men at the relieving tackles of the helm; another smashed the stern-post, carried away bulkheads, and killed all the men at the tiller; a third penetrated the turret and killed all the men at the gun; a fourth exploded in the turret, fragments of it passing out near the turret-top and killing the second officer, while others pierced the conning tower and blew to pieces the admiral commanding. "On the main deck," says one account, "the wardroom and stern-cabin were quite destroyed; there was hardly a trace of the bulkhead; the contents of the state-rooms were strewn about the flooring, and the upper-deck ceiling was one mass of powder and disintegrated human remains." A private account, which I received from an officer who went on board immediately after the action, convinced me that the effects of the exploding shells had been much more extensive and horrible than even the above account would appear to indicate. I cannot help repeating that it seems to me most remarkable, and most unfortunate, that we have not had the actual effects of modern shell striking and exploding within unarmored structures fully determined by experiment long since. During the last Parliament, and therefore several years ago, I complained repeatedly of this information not being acquired, and I would again strongly recommend that it be experimentally ascertained. Of one thing I am satisfied, and that is, that if such experiments should prove that the danger of large unarmored appendages or superstructures to armored ships should prove to be great, means can be found for either providing them in a safer manner, or for dispensing with them altogether, and that, too, without any great sacrifice of the residential qualities of the ship.

But whatever may be the doubts about armored ships with unarmored parts, there can be no doubt at all of the horrible effects of modern shell-fire upon unarmored ships, should they be brought closely and seriously under fire. So certain and so great must be the havoc which shell will make in them in that case, that I cannot force myself to doubt that the people who disclaim for the British officer and seamen the protection of armor, or would withhold it from them, must really contemplate their running away from those naval engagements which it has hitherto been both their habit and their glory to seek. For let it be borne in mind that, under many conceivable, and, indeed, under many ordinary circumstances, in which our men-of-war must expect to find themselves, the only alternative to taking to their heels must be certain and sudden destruction, or an extremely near approach thereto. And my impression that running away is what is really contemplated is confirmed by much of what one reads from the pens of those who decry the use of armor.

Now, let it be perfectly well understood that in objecting to, and in even denouncing, unarmored ships as trustworthy, as fighting ships, for the protection of our commerce, and for other purposes, I am not at all condemning them *in toto*. There are uses for unarmored ships; in our naval service there are many uses. There has been, for example, the suppression of the slave-trade, which can just as well be accomplished by unarmored as by armored ships. There is the protection of coast colonies, fisheries, naval surveys in remote seas and rivers, and the like, which unarmored vessels can well perform. There is armed support and authority to be supplied occasionally to colonial governments, and other representatives of our interests in distant parts of the world. There is the prevention of piracy, which would often be carried on in lightly-armed vessels, to the detriment of our world-wide commerce, if the British flag flying upon an armed vessel of the queen were not frequently and almost everywhere to be seen. It is not at all impossible that some of our fellow-subjects even, whose loyalty is not overpowering, might give us a good deal of trouble afloat if we had nothing but our ironclad squadrons to move about and keep order. At times there are ports to blockade, and blockade-runners to be watched or captured. For all such services unarmored ships alone are usually needed by us, and it would be extravagance and folly to armor all the vessels employed upon them.

Other nations have other reasons for possessing unarmored craft. In 1863 the United States government decided to build a number of ocean cruisers,—as they are again doing now, indeed,—and this is a statement of the objects with which they were to be constructed, from the pen of a high authority:

"They were to be capable of overtaking the Confederate vessels, and of driving the mercantile marine of a hostile country from the seas. As a principal object of their existence was the annihilation of an enemy's commerce, they were not to take part in an engagement unless an opportunity favorable to themselves presented itself. If they should encounter a more powerful opponent they were to take to flight. Their especial duty being to injure and annihilate" ("unarmored vessels" being understood), "they were not to do battle with an enemy of greater strength." [2]

In this destruction of other people's commerce we have had but a secondary interest, and none at all in so far as the production of war-vessels for the purpose is concerned, as we could charter scores of mercantile steamers every whit as capable as the American cruisers of doing the work above sketched out; but I have quoted the passage for a reason which will appear in a moment. Meanwhile, let me express the hope that I have made it sufficiently and largely apparent that this country has many uses for which unarmored ships are in every way qualified. Such ships need not be heavily armed, nor need all of them be of any great speed. Some of them, nevertheless, may evidently with advantage be endowed with very great speed indeed, and a few of them may, with equal advantage, carry a heavy gun or two.

But the question which now arises, and deserves to be put with very great urgency, is, whether this description of vessel, which—as Sir

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[2] Sir Thomas Brassey's "British Navy," vol. i. p. 477.

Thomas Brassey well says, finds its legitimate occupation (when confronted by an enemy worth calling one) in "taking flight"—is the right kind of a vessel for us to intrust with the defense of our commercial fleets from such aggressors. I should like to ask, if we are so foolish as to provide for our defense no better, no more capable fighting ships than these, which are fit only to run away, why the enemies should run away at all, and what they are to run away from? The presumption surely is, that those who are intrusted with the responsibility of protecting the property and the honor of the country will provide ships from which ocean depredators such as these would be but too glad to get away, but which, by their speed, will prevent them from escaping, and by their pronounced superiority in fighting qualities will be pretty sure to give an excellent account of them should they attempt resistance. These considerations they were which induced me recently to propose in the columns of the *Times* that a few very fast ironclad cruisers should be constructed for sweeping the seas, if necessary, of armed privateers.

It is not my intention to repeat here what I have already said elsewhere, but it is well worth while to take some pains to show the perfect practicability of building twenty-knot ironclad cruisers. And, in the first place, it may be said that here, if anywhere, we have an opportunity of limiting the armored area of the ship's side, and substituting, at the ends, sub-water armored decks, cellular constructions filled with cork, or any other devices that may be proved experimentally to serve the purpose of keeping water out of the ship, and preventing her from losing the power of steaming fast. I say "proved experimentally" to serve this purpose, because it seems to me unscientific, improper, and in a high degree dangerous, to trust to such devices without experimental proof of their efficacy. But whatever it is safe and proper to trust to in this respect in the case of any armored fighting ship, it would be safe to trust to in the case of these cruisers, because, while the ordinary line-of-battle ironclads are liable to suffer from a concentrated and continued fire of explosive shell, a very fast ironclad for protecting commerce would seldom, if ever, while on that service, be subject to more than the very limited and occasional fire of the unarmored enemy or privateer. At the same time, the full possession of her speed is a matter of such supreme importance to the class of ship we are now considering, that no risk of losing it from the failure of exposed cells, etc., should be run. It may be further said that it would not be at all necessary or desirable to armor these very fast cruisers with the thickest armor employed on line-of-battle ships, because the 80-ton or 100-ton guns which that is designed to resist are not carried by privateers or any mere vessels of prey. In this view I have the full concurrence of the Admiralty, because, while they are protecting the water-lines of the "Admiral" class of line-of-battle ships with armor eighteen inches thick, they are content with considerably less upon the ocean cruisers "Impérieuse" and "Warspite." For like reasons, it would be equally unnecessary to arm these twenty-knot cruisers with extremely heavy guns, much lighter guns being in every respect efficacious against the whole race of unarmored vessels. As against thick armor, the largest guns are the most desirable; but as against unarmored ships, it is generally deemed more advantageous to have lighter guns, and more of them, so as to multiply the wounds inflicted.

Premising, then, that moderate armor and guns are all that are necessary for the purpose in view, it is easy to see that the question of producing extremely fast armored cruisers is not only a practicable, but an easy one; it is at least quite as easy a one as the mercantile problem of carrying a large amount of cargo, with the necessary coal supply, in the twenty-knot transatlantic steamers. To accomplish the object we must, however, depart greatly from the present forms and proportions of most of our armored ships of war, and reverse that resort to short ironclad ships which I was myself fortunately successful in bringing about twenty years ago. I must be pardoned the seeming vanity of saying that the conversion effected among ship-builders and naval officers at that time by the successful introduction of the short fourteen-knot ironclads of my design, has been too great, and is proving too lasting,—or, rather, is being allowed to operate against the resort to proper length in armored cruisers. The attainment of fourteen and a quarter knots of speed by the "Bellerophon" (at a time when, as the First Lord of the Admiralty informed me he could find no one but Sir Spencer Robinson and myself who believed that she could possibly exceed eleven knots), revolutionized naval ideas on this subject, and has made the short ship the only form of ironclad that even the Admiralty, apparently, are disposed to favor. In no other way can I account for the proportions of the "Impérieuse" class of cruisers, which are but a few feet longer and several feet broader than the "Bellerophon," on about the same displacement, although the ends are unarmored and the speed is to be much greater. I do not wish to dogmatize on the subject, but it appears to me that all the ruling reasons which led, and rightly led, to the shortening of the ironclad line-of-battle ships are wanting in the case of the very last ironclad cruiser. Take the case of coal supply, for example: is it not obviously undesirable, in carrying say two thousand tons of coal, to sea, to do so in a short length of a ship of large section, rather than in a longer length of less section? It is true that the necessity of giving the entire ship the requisite protection by armor comes in to regulate this consideration and all similar considerations; but all my investigations and calculations go to establish the fact that, with armored belts of moderate armor and small depth, a very high speed is most economically attained by much greater length than is at present in favor; while in so far as long unarmored ends are concerned, excessive breadth in them is a manifest, and is also a manifold, disadvantage.

In short, it becomes my duty to express the belief that the considerations which led to the great shortening of the line-of-battle ironclad do not hold in the case of the very fast armored cruiser, and that by adhering to very short lengths—in relation to the extremely high speeds that have become urgently necessary—we are hindering a form of progress, viz., speed, which is of the first consequence to our naval efficiency and repute. I am quite prepared to hear it said after this that I am recanting former opinions, and seeking to reverse the most conspicuous change in the design of ironclads which I have myself brought about. This will be the language of those who jump to conclusions; but it will not be the language of those who reflect sufficiently upon the subject. Fully armored ships, with high armored sides, and with armor of great thickness, whether they are to be fast or slow, must be made short, and their shortness is in every way a great advantage to them for close naval engagements, in which heavy armaments, rams, and torpedoes have to be both brought into play and avoided to the fullest extent possible. But the case of a swift armored vessel for overhauling privateers and all sorts of unarmored craft is a totally different one; a shallow and limited belt is for the most part all that is required, and in her, wholly different proportions are absolutely demanded. This is no reversal of any doctrine or view of mine, but is perfectly consistent with, and essential to, the only views of the subject which I have either advocated or carried out.

With the foregoing principles admitted, the design of an ironclad cruiser as fast as the "Oregon" or the "Umbria," or still faster, falls entirely within the competence of the naval constructor, the armor and armament in the former taking the place of the cargo and of part of the coal supply of these Atlantic ships. But in saying this, I do not wish to have it understood that we need go to their full lengths, or even nearly to their full lengths. But if that were otherwise, it would in no way and in no degree deter me from advocating the employment of a few ironclads of supreme speed, because the question of manœuvring power, to which extreme length is adverse, falls altogether into abeyance in the case of the cruiser, whose one primary quality (the necessary offensive and defensive qualities being assumed) is that of superior fleetness. There is no good reason whatever—not even the dock difficulty, which is so great a hindrance to our naval development in many ways—against giving to these swift armored cruisers whatever length they may require.

If the views which are stated above be correct, there is a most serious deficiency in our navy, of which, until the appearance, on October 20, of the letter to the *Times* previously adverted to, no account whatever had been taken. England, with her immense mercantile marine to protect in every quarter of the globe, and seeing fleet unarmored ships capable under present conditions of preying freely upon that mercantile marine springing up on every side, has provided nothing whatever in the shape of fast armor-protected vessels to defend herself against the unspeakable disaster of seeing her merchant ships driven from the seas. I should not use quite so strong a phrase as this were our line-of-battle force what, by universal consent, it ought to be. I cannot doubt that if a few of the existing ironclads could be spared for escort duty, the faster of them would contrive to convoy a goodly number of merchantmen, and keep unarmored craft at bay, especially if assisted by an auxiliary escort of armed merchantmen. But our line-of-battle navy is itself so limited in numbers that no government would venture, in any serious war, to weaken our European force by detaching ironclads on escort duty. And even if this were otherwise, by no conceivable system of escort could anything more than a fractional part of our trade upon certain great routes be carried on. If I be right, therefore, in believing that unarmored vessels are of themselves unequal to the task of overpowering the fast armed craft that in war would be let loose upon our merchantmen, then it follows that no efficient defense for these merchantmen has been even commenced or attempted. We have but one finished ironclad of fifteen knots, and the two armored cruisers under construction are designed for but sixteen knots, and carry but a moderate supply of coal for their steam-power.

It will be said—it has been said—that for the price of one such twenty-knot ironclad as I am recommending two or three such vessels, say as the "Esmeralda," might be produced, and that as a matter of economy, therefore, it would be better to build "Esmeraldas." To my mind no form of extravagance and wanton waste could well be worse than that of expending public money upon articles which you know beforehand are perfectly unfit for their purpose. And where the purpose is to overpower unarmored vessels, why send out unarmored vessels to perform the work, seeing that the vessel you send out may in that case be just as easily overpowered or destroyed as that against which she is sent? If a single shell will destroy—and who can question it?—your unarmored vessel, while your armored cruiser may set the shell-fire of the unarmored ship at defiance, where is the wisdom, where the economy, of preferring the two or three impotent to the one omnipotent ship?

I believe the public sense and the public sentiment need awakening on this question, and especially the sense and sentiment of our economists. All my life I have pleaded and worked for naval economy, and it is in the same spirit that I oppose the present tendency to lavish public money upon vessels which are not even questionable, but which are absolutely certain to fail us in the hour of need, and urge the construction of efficient ships. In the pages of this *Review*, less than almost anywhere, would I advocate a policy of even possible extravagance; in these pages, at least, I am pledged to advise only such expenditure as would be fruitful. And it is here that I enter my protest against a large outlay upon these unarmored constructions, which are cheap to build and easy to destroy, and therefore good for the builders who will be called on to replace them; but which cannot possibly yield to the country that power and that protection which they are designed to supply, and in which, in the hour of need, they are perfectly sure to prove wanting. I doubt if anybody has taken more pains than I have taken, in this article and elsewhere, to show that unarmored vessels are desirable for certain purposes. But allowing this, and even enforcing this, I view with something akin to disgust the complacency with which the British public look on and see millions of their money expended on these feeble and secondary constructions (as upon a hundred other minor and sometimes useless objects) while their real power upon the ocean, as embodied in the omnipotent ship,—for that is what the armored ship ought to be made,—is neglected, or attended to weakly and perfunctorily. And one's feeling upon this subject is aggravated almost beyond measure when one thinks of what the British navy might be made, with no extravagant expenditure, were but the spirit of the country in any way comparable with its ability and its resources. I pass through the great marine-engine factories of this country, and what do I see? Sometimes, at least, the largest, the most splendid constructions there in hand are not for England, but for a foreign country; for the British navy, not the most powerful, but the secondary, or the weaker still are produced, and produced in large numbers. It is the same thing with the armor-plate factories; the thickest and best armor which I have seen produced in Sheffield—and the thickest and best in the world is produced there—has not been for England, but for foreign ships. It seems to be thought prudent and economical by us to mutiply, almost without number, the small and slow and unarmored species of war-vessels; of their aggregate cost we never think; but we turn wonderfully economical the moment it is proposed to us to produce a ship of such commanding qualities as would make the British navy both the admiration and fear of the world.

I profess for myself to be equally unable to sympathize with, or to understand, a policy which, at a time when superior power at sea is in direct and unquestionable proportion to the use we make of steel and steam-power, and when Providence has privileged us to stand first among the nations of the world in the ability to secure by the agency of steel and steam that dominance on the ocean which our unparalleled maritime interests justify us in desiring, and even impose upon us the duty of striving for, nevertheless permits us to shrink from turning that steel and that steam-power to account by the production of irresistible ships, and allows us to fritter away our resources on anything and everything, provided only that it be weak enough to promise prompt failure should we ever have to trust to it.

Some light may be thrown upon this important subject by reference to what happened in our own navy in connection with our unarmored ships of war. When the "Inconstant" class of fast armorless frigates was designed, those of us who were responsible for their success provided them with an armament of 12-ton guns, capable of piercing much of the thin armor that was then afloat in small foreign ironclads in different parts of the world. It was considered by us that such guns would effectually dispose of any unarmored vessels against which they might be brought, and might also enable a gallant officer, under favorable circumstances, to dispose of some of these feebler ironclads if necessary. Other ships of the class, armed after I left the Admiralty, were deprived of these armor-piercing guns; a protest was made by the *Times* correspondent, and a controversy upon the subject ensued in the columns of the leading journal. I propose here to reproduce some of the statements made by distinguished naval officers and others at that time; and I know of nothing which makes them less accurate or forcible now than they were in 1874, the date referred to. A very able naval officer

—probably a high official at the time—signing himself "Seaman Gunner," held that unarmored frigates could not engage armor-clad ships with any hope of success. "Common shells," said he, "which, with their very large bursting charges, would cause such terrible destruction in unarmored ships, are powerless against armor-clad ships; whereas, on the other hand, the unarmored ships could be penetrated at all distances by common shell, within the range allowed by the size of the ports, and even one or two large common shell, exploding in the vicinity of the water-line of an unarmored ship, might very possibly place her *hors du combat*." This officer repeated these views in another letter, and further stated that, having frequently witnessed the effects produced by common shells, with their large bursting charges, on targets representing unarmored ships, the result convinced him that unarmored vessels could not, with a hope of success, contend with armor-plated vessels." Another "Seaman Gunner" said, "The armored ships will be impervious at the water-line to shell carrying heavy bursting charges, while one well-directed shell, striking the unarmored vessels between wind and water, could be sufficient to stop her fighting, for that day at all events, if not forever." A "Vice-Admiral" expressed the opinion that for an unarmored ship to give battle to an armored one would be to the former "almost certain destruction." A "Rear-Admiral" gave a similar opinion, alleging that an ironclad must "obtain a certain victory" over an unarmored vessel. The late Major Sir William Palliser said that the shell-fire of an ironclad would "in a very few minutes" convert the decks of an unarmored ship into slaughter-houses, and "leave no alternative except that of surrender or total destruction." He also said, "The effect upon unarmored ships of rifled shell-fire, whether from large or medium-sized guns, is so awful that a very few well-directed shells would suffice to utterly paralyze a crew, and place the ship completely at the enemy's mercy."

All these officers, without exception, it will be seen, took the ground that unarmored ships were so completely powerless against an armor-clad, that it was useless, and worse than useless, to arm the former with armor-piercing guns. I did not agree with them in the last particular, but it was, and is, impossible to reject their evidence as to the ready destructibility of armorless vessels. This being so, what sensible and impartial man would deliberately prefer to build armorless ships in preference to armored, on the plea that he can obtain two, or even three, of the useless vessels for the price of one efficient ship? I leave out of the question, for the moment, the inhumanity of sending our seamen to fight in ships that we know beforehand are unfit for fighting,—ships that "one or two shells" would place *hors du combat;* ships that in a very few minutes would be converted into "slaughter-houses,"—and I put the matter on the very ground of economy which the advocates of these weak and worthless vessels, with strange effrontery, profess to take up. It is bad enough to have to spend half a million of money or more upon the impervious ship, which would destroy a score of these unarmored craft without ever receiving a blow serious to herself; but to be called upon to spend nearly a quarter of a million sterling upon one of those wretched defenseless productions which a single shell may ruin, and which are to be converted into slaughter-houses if they succeed in keeping afloat a few minutes, is more than reasonable men ought for a moment to submit to.

It is a lamentable necessity, and one that I feel deeply, thus to have to oppose one's views to that of the persons who advocate our launching out into a vast expenditure upon unarmored ships; it is lamentable because there are many thoughtless persons who, seeing this antagonism, pass to the conclusion that if professional men disagree so much as to what ships ought to be built, the public may reasonably decline to extend the navy at all. The difficulty is one that often presents itself, and which cannot but be injurious to the public interest. I cannot myself see, however, the sense of refusing to build any ships, and thus abandoning altogether the national defense, because these differences of view exist. Such differences ought really to have the effect of making thoughtful persons judge for themselves between the disputants. And fortunately, the point in dispute is one upon which every thoughtful person can perfectly well judge for himself.

This, at least, will be recognized, I am sure, by all who regard the question fairly,—viz., that as between myself and those who would discard armor, I am at least on the side that it is safest for the nation to adopt. If I were proved wrong, the only evil consequence would be that we should have in distant seas, during war-time, ships needlessly powerful, which had cost more money than was necessary. Our power on the seas, as a nation, would be fully asserted, and in that case, over-asserted; but surely the fact that Great Britain was needlessly strong in war, and that its commerce was protected by ships of excessive strength and speed, would not be one about which we should greatly grieve. On the other hand, if the policy of my opponents be a false one, and if the nation should hereafter find that we cannot trust to these armorless ships to assert our authority,—if it should become known to us that the enemy, having no more occasion to fear us than we have to fear him, had closed with our armorless defenders and got the better of them,—then indeed should we regret that false, that foolish economy which had led us to spend our money in vain and our strength for naught. Nor let it be forgotten, either, that if I be right in my contention that the fast armored cruiser is essential, and if my advice be neglected, it will be beyond our power to correct the error with war upon us. Armored cruisers take at least a couple of years to build. But, on the other hand, if in war-time we should experience a deficiency in unarmored vessels, we have the fast mercantile fleet of the country to draw upon, without delay or hindrance, and the want can be supplied almost as soon as it is known.

I do not hesitate to acknowledge, nevertheless, that it is in no hopeful spirit that I pen this article. There was a time when, as a people, we took a pride in our navy, and were animated by an ardent national spirit. Even in those days, however, we allowed the French to surpass us in the construction of ships, and some of the finest line-of-battle ships which we possessed in the great war were captures from the French, captures due to the fact that the prowess of our officers and men more than made good our other deficiencies. It may be that that prowess would still make good many a defect, but that is a contingency upon which we can rely less than ever, and for this very important reason: in the old days we had *time* in which to make our dogged courage and persistency tell, but in future naval fights the element of time will be almost wanting. In these days the national spirit must assert itself in the preparation for war no less than in the actual fighting, and unhappily the national spirit does not assert itself, and we lie at the mercy of such chances and accidents as may arise. In these days a pretender is as much esteemed as a patriot, and if the semblance of cheapness goes together with the pretence, more solid considerations have little or no weight. It is even doubtful whether men are not scared by the thought of real efficiency in a war-ship, and are attracted by the idea of a weak vessel trying to manœuvre herself into a success which she cannot bluntly command. This, it seems to me, is why we hear so much about protective decks a single inch in thickness; cells with a little cork or canvas or oakum in them; the protection derived from the consumable store, coal; choosing your distance in encountering an enemy; fighting end on; playing a game of long bowls; and so forth. All these are phrases and fancies which an enemy with a faster and better armored ship will dispose of like so many defenses of glass. It is not in Old England, which once had the proud habit of laying itself alongside of the foe, that we ought to have so much of these things; nor should we hear so much of them if we had not lost much of the old tone and temper which secured our fame. As a nation we no longer esteem power, or we should not part with it on such specious pretexts as now win it from us. My advocacy of impervious ships will probably not be listened to; the pervious ship, which "one shell" will dispose of, will probably prove more to the public taste, because its first cost is less, and two of the kind can be obtained for the price of the one useful and durable vessel.

A FORGOTTEN AMERICAN HUMORIST.

"A fellow of infinite jest, of most excellent fancy."—*Hamlet.*

BY MRS. LAUNT THOMPSON.

TWENTY years ago, when all the rising generation of America were shouting with laughter over Artemus Ward's droll experiences, the worn copy of "Phœnixianæ" from which the following extracts were taken was given to the writer of this article, with the remark that it was as well that the "Showman's" admirers should know the source from which he drew his inspiration.

It is not always, nor perhaps even often, the case that what pleases us in youth can stand the test of the severer criticism of our riper years; but the audacious fun which brightens every page of "Phœnixianæ" has in it the immortal quality: it is not for one age, but for all; and it beguiles wayworn men and women as readily to laughter now as in the days when the toils and cares of life were unknown quantities in the sum of existence. Notwithstanding the great success which Artemus Ward obtained,—notably in England, where, to the immense amusement of his compatriots, a glossary, explanatory of his peculiar terms, was published,—notwithstanding the fact that he was deliciously funny, the few readers of "Phœnixianæ" have seen no reason to modify the opinion formed on first reading its brilliant pages,—that "John Phœnix" was the prince of American jesters, and that his irresistible and original humor was the moving spring of the vast flood of "native" humorists which has since diffused itself over the United States. An attempt to define humor, even if such definition were within the writer's power, would not come within the scope of this article, and the distinction between English and American humor, though it has been a theme fruitful of discussion from many pens, is probably as far as ever from being defined to the satisfaction of everybody. But in one proposition it is probable that all English speaking and writing people would agree, namely, that to the Anglo-Saxon race belongs the jester's palm. There is no such fun as Anglo-Saxon fun, whether it be the broad loud jesting of the Briton, or the sly, quaint, half-hinted witticism of his Transatlantic cousin.

Perhaps the most salient difference between English and American humor lies in the fact that the American particularly enjoys a joke against himself, and retails it with peculiar grace and gusto; and this quality, observable in all American humorists, is one of the most marked characteristics of the writings of "John Phœnix."

"John Phœnix," *alias* "Squibob," in private life Lieutenant George H. Derby, of the U. S. Topographical Engineers, graduated at West Point in 1846, having entered as a cadet in 1842. He is described as having been, at the time of his entrance, a remarkably tall and strong fellow for his age (sixteen), and equally mature mentally. He had seen much more of life—the worst side of it—than most boys of that age, and the tone of his mind is said to have been profoundly injured by it. He was very ambitious; and a certain solid quality of mind which he possessed—a quality which adds a great deal to the splendor of his humor—combined with his quick intelligence to make him an admirable scholar, and, intellectually, one of the best men in his class. He was extravagantly fond of "sprees" and of all manner of wild gayety; but, as every "demerit" counts at West Point, it behooved him to be very careful as to his behavior, in order to keep his place in the class, and it was probably for this reason only that his conduct was, in the main, good. One of his fellow-classmates describes him as having been "a *rara avis* among green youths." He had a good deal of *bonhomie*, and, while habitually grave and serious in appearance, was always bubbling over with fun and humor. He quickly became famous at West Point, no less for the fertility he displayed in inventing, and ingenuity in practicing, the practical jokes in which his soul delighted, than for his clever sketches and caricatures, and his quickness of repartee. He possessed, too, a vast *répertoire* of stories, the nature of which, combined with the fact that he was much given to illustrating his text-books with marginal drawings of a very Juvenalesque character, drew upon him sharp reprimands and the deep disapproval of the professors. His passion for illustrating his text-books in this manner gave rise to a regulation, which still holds good at West Point, obliging the cadets to hand their text-books to the professors for inspection on the first of every month. This regulation once afforded Derby an opportunity for a very clever practical joke; a joke which was so innocent, as well as witty, that it was freely pardoned by the professor at whose expense it was committed. It occurred in this wise. The class was assembled in Professor d'O.'s room, and the lesson had already begun, when Professor d'O., interrupting himself, said suddenly,—

"Ah! it is the first of the month, I see. Gentlemen, hand me your text-books."

There was a general move to obey the order on the part of all except Derby, who was observed to start violently, and, hastily seizing his text-book, to thrust it into his desk. This, of course, did not pass unnoticed.

"Mr. Derby," said Professor d'O., sternly, "hand me your text-book, sir."

"Could I be excused just this once, sir?" faltered Derby.

"Certainly not, sir," returned Professor d'O., severely. "Do you not remember that you are the principal cause of this regulation? It is your text-book I particularly want to see, Mr. Derby. Bring it to me at once, sir."

"But I had rather not, sir," hesitated Derby.

"Perhaps so, sir," replied Professor d'O.; "but you must."

Amid the profound silence and strained expectation of the whole class, Derby slowly walked up to the rostrum, and with elaborate reluctance yielded up his text-book. Behold! its pages were innocent of any illustration whatever, and the blank space above the opening chapter bore, in capital letters, the legend, "APRIL FOOL." It was the first of April, and, as we have said, the joke was forgiven.

Notwithstanding his brilliant qualities, Derby became so unpopular at West Point that during his last year there were only one or two rooms (among the first-class men) where he was tolerated. This was not because of his powers of raillery or caricature, for the victims of both heartily forgave any fun at their expense, but rather because at that time he had very little sense of justice, honor, or decency in the perpetration of his jokes, and sooner or later alienated almost every one. In justice to him, it must be said that, in the indulgence of his humor, he would peril his own reputation and success as carelessly and readily as that of any other man; and as an illustration of this utter recklessness of consequences, it was long told at West Point how Derby, on the day he graduated, had the impudence to send a green cadet, whose duty it was to report to a cadet officer, straight into the awful presence of General the Military Superintendent, before whom, in the usual course of things, he would not have appeared officially for four years. The etiquette of West Point is, like the laws of the Medes and Persians, not to be infringed without fearful consequences, and in this instance there is no doubt that Derby would have been severely punished had the young cadet been allowed to reach General ——'s presence. Fortunately, a compassionate bystander interfered, upon whom Derby turned in fury, saying that it was a "pity that a fellow-classmate should spoil the last joke he was likely to perpetrate at West Point."

"What an ass you are, Derby!" returned Lieutenant ——. "Don't you know that it would have been worse for you than for him?"

"That's so," returned Derby, mollified. "But I should have had my joke anyway," he added, with regret.

In 1848 Derby was sent to California, and it was in California that he wrote and published the sketches which, collected in a volume, bear the title "Phœnixianæ." Racy, humorous, and alive with stinging satire, they are tinged throughout with a local coloring, the truth of which will necessarily be less and less appreciated as years go on. For the California of thirty years ago has ceased to be so absolutely, that it is not easy even for an American to see the force of many an allusion which once contained a bitter, and, it is to be feared, too often a needed, shaft of satire. Derby is said to have led a life "wilder than the wildest" during the first years of his residence in California, where his passion for practical jokes and reckless gayety naturally had an almost unlimited scope. But after his marriage (in 1852) to a very good and lovely woman, he reformed entirely, and became in all respects a thoroughly estimable man. He had early become famous, and many of his brilliant, bitter sayings have become household words in California, and fall daily from thousands of lips whose owners never heard of this prince of American jesters. There is a well-known incident which illustrates the profound confidence felt in his inexhaustible spring of humor, a confidence which was not misplaced, as the sequel shows.

Early in the year 1850, Derby was a passenger in a ship bound from New York to San Francisco. The voyage was to be "round the Horn," as Californians phrase it, and, therefore, necessarily an affair of months. The ship was crowded with passengers of both sexes, and of all ages and conditions; and the dismay of the captain and surgeon may be imagined when a case of cholera broke out in the steerage. It was genuine Asiatic cholera, over in a few hours; and when the victim, who, fortunately, perhaps, for his fellow-passengers, was friendless and unknown, had been committed to his "vast and wandering grave," the captain, surgeon, and a cool-headed, kind-hearted United States officer, who alone, of the passengers, knew the nature of the dead man's illness, had a consultation as to what was to be done. All three agreed that it was imperatively necessary to keep the secret, and it was a case in which "prevention" was the only hope. There was no cure for cholera, that was admitted; therefore it was not only indispensable to maintain a strict silence on the subject, but also, if possible, to keep the passengers from indulging in speculations or anxieties with regard to the dead man's illness.

But it is no easy matter to amuse several hundred people in mid-ocean so successfully that no room is left for restless or uneasy thoughts, and after long cogitation no safeguard against cholera had been found, when suddenly the captain sprang from his chair.

"I have it!" he cried. "We'll get Derby to amuse them—for a 'consideration.'"

And then and there Derby was sent for, sworn to secrecy, and entreated to take the responsibility of keeping the passengers amused and interested until they reached San Francisco. The "consideration" which the captain felt himself justified in promising on behalf of the owners of the ship was something enormous, and Derby accepted the offer and the responsibility.

He performed his part of the bargain to perfection, and during the remaining weeks of the voyage kept every one on board in roars of laughter and in perfect health. The ship reached San Francisco in good condition and without having lost any more passengers, and her owners gladly redeemed the promise made by the captain.

Great as was the strain upon his powers during this voyage, it is said that he never once repeated himself, and never said anything that seemed forced or far-fetched, or uttered for effect. This will be easily credited by any one who reads "Phœnixianæ," a book in which each absurdity seems more delightful than the last. Take, for example, "Phœnix's" engineering experiences in California, as given in his "Official Report on the Central Route," and observe at the outset with what a fine absence of nepotism he organizes his corps.

"In a few days my arrangements were completed, and my scientific corps organized as follows:

"John Phœnix, A.M., Principal Engineer and chief Astronomer.

"Lieut. Minus Root, Apocryphal Engineers, First Assist. Astronomer.

"Lieut. Nonplus A. Zero, Hypercritical Engineers, Second Assist. Astronomer.

"Dr. Abraham Dunshunner, Geologist.

"Dr. Targee Heavysterne, Naturalist.

"Herr von der Weegates, Botanist.

"Dr. Fagy L. Bigguns, Ethnologist.

"Dr. Tuskmaker, Dentist.

"James Phœnix (my elder brother), Treasurer.

"Joseph Phœnix (elder brother), Quartermaster.

"William Phœnix (younger brother), Commissary.

"Peter Phœnix (younger brother), Clerk.

"Paul Phœnix (my cousin), Sutler.

"Reuben Phœnix (my cousin), Wagon Master.

"Richard Phœnix (second cousin), Assist. Master.

"These gentlemen, with 184 laborers employed as teamsters, chainmen, rodmen, etc., made up the party. For instruments we had 1 large transit instrument (8-inch achromatic lens), 1 mural circle, 1 altitude and azimuth instrument (these instruments were permanently set up in a mule-cart, which was backed into the plane of the true meridian when required for use), 13 large theodolites, 13 small do., 8 transit compasses, 17 sextants, 34 artificial horizons, 1 sidereal clock, and 184 solar compasses. . . . Disliking to abandon our new line, which had been selected with much care and at great expense, I determined to employ in its measurement a reflecting instrument, used very successfully by the United States coast survey. I therefore directed my assistants to procure me a HELIOTROPE; but after being annoyed by having brought to me successively a sweet-smelling shrub of that name and a box of 'Lubin's Extract' to select from, it was finally ascertained that no such instrument could be procured in California. In this extremity, I bethought myself of using as a substitute the flash of gunpowder. . . . Believing these experiments more curious than useful, I abandoned the use of the 'heliotrope' or its substitutes, and determined to reverse the usual process, and arrive at the length of the base line by subsequent triangulation. I may as well state here that this course was adopted, and resulted to our entire satisfaction; the distance from Fort Point to Sancelito by the solution of a mean of 1,867,434,926,465 triangles being determined to be exactly *three hundred and twenty feet.* This result differed very much from our preconceived ideas and from the popular opinion, the distance being generally supposed to be some ten miles; but I will stake my professional reputation on the accuracy of our work, and there can, of course, be no disputing the elucidations of science or facts demonstrated by mathematical process, however incredible they may appear *per se.*

"We had adopted an entirely new system of triangulation, which I am proud to claim (though with becoming modesty) as my own invention. It simply consists in placing one leg of a tripod on the initial point, and opening out the other legs as far as possible; the distance between the legs is then measured by a two-foot rule, and noted down, and the tripod moved, so as to form a second triangle connected with the first, and so on, until the country to be triangulated has been entirely gone over. By using a large number of tripods, it is easily seen with what rapidity the work may be carried on; and this was, in fact, the object of my requisition for so large a number of solar compasses, the tripod being, in my opinion, the only useful portion of that absurd instrument."

Want of space compels the omission of the inimitable description which follows, in which the results of Phœnix's system are not always what he desires; of the novel mode of progression through the country, and the still more novel exploits of the scientific gentlemen attached to the expedition; but it is impossible not to quote another of Phœnix's inventions.

"I had made arrangements," he continues, with majestic calm, "to measure the length of Kearny Street by two methods: first, by chaining its sidewalks; and, secondly, by a little instrument of my invention called the 'go-it-ometer.' This last consists of a straight rod of brass firmly strapped to a man's leg, and connected with a system of clockwork placed on his back, with which it performs, when he walks, the office of a *ballistic pendulum*. About one foot below the ornamental buttons on the man's back appears a dial-plate, connected with the clockwork, on which is promptly registered, by an index, each step taken. Of course, the length of the step being known, the distance passed over in a day may be obtained by a very simple process. . . . After seeing the camp properly arranged, the wheelbarrows parked, and a guard detailed, I sent for the chainmen and go-it-ometer bearer, to ascertain the distance traveled during the day.

"Judge of my surprise to find that the chainmen, having received no instructions, had simply drawn the chain after them through the streets, and had no idea of the distance whatever. Turning from them in displeasure, I took from the go-it-ometer the number of paces marked, and, on working the distance, found it to be four miles and a half. Upon close questioning the bearer, William Boulder (called by his associates 'Slippery Bill'), I ascertained that he had been in a saloon in the vicinity, and, after drinking five glasses (probably 2½ quarts) of a beverage known among the natives as 'Lager Bier,' he had danced a little for their amusement. Feeling very much dissatisfied with the day's survey, I stepped out of the camp, and stopping an omnibus, asked the driver how far he thought it to the 'Plaza.' He replied, 'Half a mile;' which I accordingly noted down, and returned very much pleased at having so easily obtained such valuable information. It would appear, therefore, that 'Slippery Bill' had actually danced four miles in a few moments."

This fun is certainly audacious enough; but it pales before the examples given by Phœnix of the "singular fertility" of Californian soil.

"The country in the vicinity of the route, after leaving Southwick's Pass, is very productive," he observes. "A building was pointed out to me near our line of march as the locale of a most astounding agricultural and architectural phenomenon, which illustrates the extreme fertility of the soil in a remarkable degree. A small pine wardrobe, which had been left standing by the side of the house (a frame cottage, with a piazza) at the commencement of the rainy season, took root, and in a few weeks grew to the prodigious height of thirty feet, and, still preserving its proportions and characteristic appearance, extended in each direction, until it covered a space of ground some forty by twenty feet in measurement . . . and it now answers every purpose of an addition to the original cottage, being two stories in height!"

The remainder of this remarkable chapter is equally brilliant, and is embellished by some of the droll little sketches for which Derby was famous, and with which he was wont to eke out the expression of his thought. His "Musical Review Extraordinary," admirably witty as it is, is too long for quotation here, and too connected to admit of extracts. We proceed, therefore, to "Phœnix's" "New System of English Grammar." "I have often thought," he begins, "that the adjectives of the English language were not sufficiently definite for the purposes of description. They have but three degrees of comparison,—a very insufficient number certainly, when we consider that they are to be applied to a thousand objects, which, though of the same general class or quality, differ from each other by a thousand different shades or degrees of the same peculiarity. . . . To a man of a mathematical turn of mind, to a student and lover of the exact sciences, these inaccuracies of expression—this inability to understand *exactly* how things are—must be a constant source of annoyance; and to one who, like myself, unites this turn of mind to an ardent love of truth for its own sake, the reflection that the English language does not enable us to speak the truth with exactness is peculiarly painful. For this reason I have, with some trouble, made myself thoroughly acquainted with every ancient and modern language, in the hope that I might find some one of them that would enable me to express precisely my ideas; but the same insufficiency of adjectives exists in all except that of the Flathead Indians of Puget Sound, which consists of but forty-six words, mostly nouns, but to the constant use of which exists the objection that nobody but that tribe can understand it; and as their literary and scientific advancement is not such as to make a residence among them for a man of my disposition desirable, I have abandoned the use of their language, in the belief that for me it is *hyas cultus*, or, as the Spaniard hath it, *no me vale nada*.

"Despairing, therefore, of making new discoveries in foreign languages, I have set myself seriously to work to reform our own, and have, I think, made an important discovery, which, when developed into a system and universally adopted, will give a precision of expression, and a consequent clearness of idea, that will leave little to be desired, and will, I modestly hope, immortalize my humble name as the promulgator of the truth and the benefactor of the human race. Before entering upon my system, I will give you an account of its discovery, which will surprise you by its simplicity. . . . During the past week my attention was attracted by a large placard embellishing the corners of our street, headed in mighty capitals with the word PHRENOLOGY, and illustrated by the map of a man's head, closely shaven, and laid off in lots, duly numbered from one to forty-seven. Beneath this edifying illustration appeared a legend, informing the inhabitants of San Diego and vicinity that Professor Dodge had arrived, and taken rooms (which was inaccurate, as he had but one room) at the Gyascutus House, where he would be happy to examine and furnish them with a chart of their heads, showing the moral and intellectual endowments, at the low price of three dollars each.

"Always gratified with an opportunity of spending my money and making scientific researches, I immediately had my hair cut and carefully combed, and hastened to present myself and my head to the professor's notice. I found him a tall and thin professor, in a suit of rusty, not to say seedy, black, with a closely-buttoned vest, and no perceptible collar or wristbands; he wore a brown wig, beneath which, as I subsequently ascertained, his bald head was laid off in lots, marked and numbered with Indian ink, after the manner of the diagram upon his advertisement. Upon a small table lay many little books with yellow covers, several of the placards, pen and ink, a pair of iron callipers with brass knobs, and six dollars in silver. Having explained the object of my visit, . . . the professor placed me in a chair, and, seizing the callipers, he embraced with them my head in various places, and made notes upon a small card that lay near him on the table. He then stated that my 'hair was getting very thin on the top,' placed in my hand one of the yellow-covered books, which I found to be an almanac containing anecdotes about the virtues of Dodge's Hair Invigorator, and, recommending it to my perusal, he remarked that he was agent for the sale of this wonderful fluid, and urged me to purchase a bottle,—price two dollars. Stating my willingness to do so, the professor produced it from a hair trunk which stood in a corner of the room, which he stated, by the way, was originally only a pine box, on which the hair had grown since the 'Invigorator' had been placed in it (a singular fact), and recommended me to be cautious in wearing gloves while rubbing it upon my head, as unhappy accidents had occurred,—the hair growing freely from the ends of the fingers if used with the bare hand. He then seated himself at the table, and, rapidly filling up what appeared to me a blank certificate, he soon handed over the following singular document:

"'Phrenological chart of the head of Mr. John Phœnix, by Flatbroke B. Dodge, Professor of Phrenology, and inventor and proprietor of Dodge's celebrated Hair Invigorator, Stimulator of the Conscience, and Arouser of the Mental Faculties:

Temperament—Lymphatic, Nervous, Bilious.

Size of head	11
Amativeness	11½
Caution	8
Combativeness	2½
Credulity	1
Causality	12
Conscientiousness	12
Destructiveness	9
Hope	10
Imitation	11
Self-esteem	½
Benevolence	12
Mirth	1
Language	12
Firmness	2
Veneration	12
Philoprogenitiveness	0'

"Having gazed on this for a few moments in mute astonishment, I turned to the professor, and requested an explanation. 'Why,' said he, 'it's very simple: The number 12 is the maximum, 1 the minimum. For instance, you are as benevolent as a man can be; therefore I mark you Benevolence 12. You have little or no self-esteem—½; you have scarcely any credulity. Don't you see?'

"*I did see!* This was my discovery. I saw at a flash how the English language was susceptible of improvement, and, fired with the glorious idea, I rushed from the room and the house, heedless of the professor's request that I would buy more of his Invigorator, heedless of his alarmed cry that I would pay for the bottle I'd got, heedless that I tripped on the last step of the Gyascutus House, and smashed there the precious fluid (the step has now a growth of four inches of hair on it, and the people use it as a door-mat). I rushed home, and never grew calm till, with pen, ink, and paper before me, I commenced the development of my system.

"This system—shall I say this great system?—is exceedingly simple, and easily explained in a few words. In the first place, 'figures won't lie.' Let us then represent by the number 100, the maximum, the *ne plus ultra* of every human quality,—grace, beauty, courage, strength, wisdom, learning,—everything. Let *perfection*, I say, be represented by 100, and an absolute minimum of all qualities by the number 1. Then, by applying the numbers between to the adjectives used in conversation, we shall be able to arrive at a very close approximation to the idea we wish to convey; in other words, we shall be enabled to speak the truth. Glorious, soul-inspiring idea! For instance, the most ordinary question asked of you is, 'How do you do?' To this, instead of replying, 'Pretty well,' or the like absurdities, after running through your mind that *perfection* of health is 100, no health at all, 1, you say with a graceful bow, 'Thank you, I am 52 to-day;' or, feeling poorly, 'I'm 13, I'm obliged to you.' . . . Do you see in this way how closely you may approximate to the truth, and how clearly your questioner will understand what he so anxiously wishes to arrive at—your *exact* state of health?

"Let this system be adopted into our elements of grammar, our conversation, our literature, and we become at once an exact, precise, mathematical, truth-telling people. It will apply to everything but politics; there, truth being of no account, the system is useless. But in literature how admirable! Take an example.

"As a 19 (young) and 76 (beautiful) lady was 52 (gayly) tripping down the sidewalk of an 84 (unfrequented) street, she came in contact 100—this shows that she came into close contact—with a 73 (fat) but 87 (good-humored looking) gentleman, who was 93 (*i.e.*, intently) gazing into the window of a toy-shop. (Gracefully) 56 extricating herself, she received the excuse of the 96 (embarrassed) Falstaff with a 68 (bland) smile, and continued on her way. But (hardly) 7 had she reached the corner of the block, ere she was overtaken by a 24 (young) man, 32 (poorly) dressed, but of an 85 expression of countenance. 91 (hastily) touching her 54 (beautifully-rounded) arm, said, to her 67 surprise,—

"'Madam, at the window of the toy-shop yonder you dropped this bracelet, which I had the 71 (good) fortune to observe; and now have the 94 happiness to hand to you.'

"Blushing with 76 modesty, the 76 (lovely) lady took the bracelet... and 84 (hesitatingly) drew forth her portemonnaie. The young man noticed the action, and 73 (proudly) drawing back, added,—

"'Do not thank me: the pleasure of gazing for an instant at those 100 eyes,'"... and so forth. This is only the commencement of a pretty little tale, culminating in the happiness of the lovers, which is represented by 100, and which illustrates Mr. Phœnix's system of English grammar to perfection.

"You would hardly believe it," he goes on to say, with a naïve appeal to the sympathy of his readers, "but that everlasting (100) scamp of a professor has brought a suit against me for stealing a bottle of his disgusting Invigorator; and as the suit comes off before a justice of the peace, whose only principle of law is to find guilty and fine any accused person whom he thinks has any money,... it behooves me to take time by the forelock. Should my system succeed to the extent of my hopes and expectations, I shall publish my new grammar early in the ensuing month.

"P.S.—I regret to add that, having read the above article to Mrs. Phœnix, and asked her opinion thereon, she replied 'that if a first-rate magazine article were represented by 100, she should judge this to be about 13; or if the quintessence of stupidity were 100, she should take this to be in the neighborhood of 96.'

"This, as a criticism, is perhaps a little discouraging; but, as an exemplification of the merits of my system, it is exceedingly flattering. How could she, I should like to know, in ordinary language, have given so *exact* and truthful an idea, how expressed so forcibly her opinion (which of course differs from mine), on the subject?"

Nothing daunted by Mrs. Phœnix's disapprobation, however, Phœnix next launches boldly forth into the realms of science; and the "Lectures on Astronomy" are unsurpassed, if not unequaled, by anything in the "Phœnixianæ."

"By the wondrous discoveries of the improved telescopes of modern times, we ascertain that upwards of several hundred millions of stars exist that are invisible to the naked eye, the nearest of which is millions of millions of miles from the earth; and, as we have every reason to suppose that every one of this inconceivable number of worlds is peopled like our own, a consideration of this fact, and that we are undoubtedly as superior to these beings as we are to the rest of mankind, is calculated to fill the mind of the American with a due sense of his own importance in the scale of animated creation.... The demonstration of the system in all its perfection was left to Isaac Newton, an English philosopher, who, seeing an apple tumble down from a tree, was led to think thereon with such gravity that he finally discovered the attraction of gravitation, which proved to be the great law of Nature that keeps everything in its place. Thus we see that as an apple originally brought sin and ignorance into the world, the same fruit proved thereafter the cause of vast knowledge and enlightenment; and, indeed, we may doubt whether any other fruit but an apple, and a sour one at that, would have produced these great results; for, had the fallen fruit been a pear, an orange, or a peach, there is little doubt that Newton would have eaten it up, and thought no more on the subject."

This is delightfully impertinent; but Mr. Phœnix's characteristic coolness is even more superbly manifested as he soars higher and higher among the celestial spheres. After favoring his readers with some highly original remarks upon the sun, he goes on to say,—

"Sacred history informs us that a distinguished military man, named Joshua, once caused the sun to 'stand still;' how he did it is not mentioned. There can, of course, be no doubt of the fact that he arrested its progress, and possibly caused it to 'stand *still;*' but translators are not always perfectly accurate, and we are inclined to the opinion that it might have wiggled a very little when Joshua was not looking directly at it. The statement, however, does not appear so very incredible when we reflect that seafaring men are in the habit of actually bringing *the sun down* to the horizon every day at 12 meridian. This they effect by means of a tool made of brass, glass, and silver, called a sextant."

After some further observations on the sun, Phœnix proceeds to the examination of the planetary system, and in winding up his remarks on Mercury he observes with not unnatural asperity,—

"The difficulty of communication with Mercury will probably prevent its ever being selected as a military post, though it possesses many advantages for that purpose, being extremely inaccessible, inconvenient, and, doubtless, singularly uncomfortable. It received its name from the god Mercury, in the heathen mythology, who is the patron and tutelary divinity of San Diego County. . . . Venus, in mythology, was a goddess of singular beauty, who became the wife of Vulcan, the blacksmith, and, we regret to add, behaved in a most immoral manner after her marriage. The celebrated case of Vulcan *versus* Mars, and the consequent scandal, is probably still fresh in the minds of our readers. . . . Venus still remains the goddess of beauty, and not a few of her *protégées* may be found in California.

"The earth, or, as the Latins called it, Tellus (from which originated the expression, 'do tell us'), is the third planet in the solar system, and the one on which we subsist, with all our important joys and sorrows. The *San Diego Herald* is published weekly on this planet, for five dollars per annum, payable invariably in advance. . . . To the inhabitants of Jupiter our important globe appears like a small star of the fourth or fifth magnitude. We recollect some years ago gazing with astonishment upon the inhabitants of a drop of water, developed by the solar microscope, and secretly wondering whether they were or were not reasoning beings, with souls to be saved. It is not altogether a pleasant reflection that a highly scientific inhabitant of Jupiter, armed with a telescope of, to us, inconceivable form, may be pursuing a similar course of inquiry, and indulging in similar speculations regarding our earth and its inhabitants. . . . A little reflection on these subjects leads to the opinion that the death of an individual man on this earth, though, perhaps, as important an event as can occur to himself, is calculated to cause no great convulsion of Nature, or disturb particularly the great aggregate of created beings.

"The earth moves round the sun from west to east in a year, and turns on its axis in a day. . . . Supposing the earth to be suddenly arrested on its axis, we all,—men, women, children, horses, cattle, and sheep, donkeys, editors, and members of Congress,—with all our goods and chattels, would be thrown off into the air at a speed of one hundred and seventy-three miles a minute, every mother's son of us describing the arc of a parabola, which is probably the only description we should ever be able to give of the affair.

"This catastrophe, to one sufficiently collected to enjoy it, would doubtless be exceedingly amusing; but as there would probably be no time for laughing, we pray that it may not occur until after our demise, when, should it take place, our monument will probably accompany the movement. . . . Science is yet but in its infancy; with its growth, new discoveries of an astounding nature will doubtless be made, among which, probably, will be some method by which the course of the earth may be altered, and it be steered with the same ease and regularity through space and among the stars as a steamboat is now directed through the water. It will be a very interesting spectacle to see the earth 'rounding to' with her head to the air, off Jupiter, while the Moon is sent off laden with mails and passengers for that planet, to bring back the return mails and a large party of rowdy Jupiterians going to attend a grand prize fight in the ring of Saturn."

After some further remarks upon the earth, Phœnix proceeds to the description of the Moon:

"This resplendent luminary, like an omnibus, is occasionally full and new. . . . Up to the latest dates from the Atlantic States, no one has succeeded in reaching the Moon. Should any one do so hereafter, it will probably be a woman, as the sex will never cease making an effort for this purpose as long as there is a man in it. . . . Upon the whole, we may consider the Moon an excellent institution; and it is a blessed thing to reflect that the President of the United States cannot *veto* it, however strong an inclination he may feel, from principle or habit, to do so."

Two more extracts from "Phœnixianæ" and we have done. Derby's passion for practical jokes, even if they involved his own risk and injury, has already been mentioned. The most original and daring practical joke he ever indulged in was during the early part of his residence in California, when the editor of the *San Diego Herald* (a Democratic organ) committed his paper to Derby's hands during his absence in San Francisco. The paper was published, as usual, weekly; but the editor's horror and indignation may be imagined when he discovered that Derby had coolly changed the politics of the paper, and that the *San Diego Herald*, which had been an uncompromising ally of the Democracy, was now no less vehement and active on the other side! The fact that this occurred in the midst of a stirring political campaign added insult to injury. Two of the most brilliantly-witty chapters in "Phœnixianæ" are devoted to Phœnix's editorial exploits, and pretend to give extracts from the *San Diego Herald* as he conducted it, and to embody his peculiar views of an editor's duty,—views which, if adopted, would, it need scarcely be said, produce an entire revolution in journalism. It is at the close of the second chapter that the "fight" occurs, which Artemus Ward transferred almost verbally to his own pages, and which is one of the wittiest things in his book. In "Phœnixianæ" it is headed

"INTERVIEW BETWEEN THE EDITOR AND PHŒNIX."

"A rumor had reached our ears that the editor had arrived. Public anxiety had been excited to the highest pitch to witness the result of the meeting between us. It had been stated publicly that he would whip us the moment he arrived; but though we thought a conflict probable, we had never been very sanguine as to its terminating in this manner. Coolly we gazed from the window of the office upon the New Town road. We descried a cloud of dust in the distance; high above it waved a whip-lash, and we said the editor cometh, and 'his driving is like that of Jehu the son of Nimshi, for he driveth furiously.' Calmly we seated ourselves in the 'arm-chair,' and continued our labors upon our magnificent Pictorial. Anon a step, a heavy step, was heard upon the stairs, and the editor stood before us.

"We rose, and, with an unfaltering voice, said, 'Well, how do you do?' He made no reply, but commenced taking off his coat.

"We removed ours, also our cravat.

* * * * * * * * * * *

"The sixth and last round is described by the pressmen and compositors as having been fearfully scientific. We held the editor down over the press by our nose (which we had inserted between his teeth for that purpose), and while our hair was employed in holding one of his hands, we held the other in our left, and with the 'sheep's-foot' brandished above our head, shouted to him, 'Say Waldo' (the Whig candidate). 'Never!' he gasped. At this moment we discovered that we had been laboring under a misunderstanding. . . .

"We write this while sitting without any clothing, except our left stocking, and the rim of our hat encircling our neck like a 'ruff' of the Elizabethan era, that article of dress having been knocked over our head at an early stage of the proceedings, and the crown subsequently torn off; while the editor is sopping his eye with cold water in the next room, a small boy standing beside the sufferer with a basin, and glancing with interest over the advertisements on the second page of the *San Diego Herald*, a fair copy of which was struck off upon the back of his shirt at the time we held him over the press."

Derby rarely noticed any attacks made upon him in the newspapers, saying that "where impudence is wit, 'tis folly to reply." He was in his grave when Artemus Ward was at the zenith of his fame, so that the unblushing act of plagiarism above alluded to passed quite unnoticed. Should another edition of "Phœnixianæ" ever be published, it will be seen that Artemus Ward was not the only American humorist who owes his inspiration to "Phœnixianæ," and who has systematically neglected to refer to that delightful volume.

With Phœnix's description of the devices of office-seekers as practiced in California in 1848–50–55, the list of extracts must be brought to a conclusion. As a specimen of his splendid powers of exaggeration and *reductio ad absurdum*, the "Inauguration of the New Collector," and another chapter entitled "Return of the Collector," are among the best efforts of his genius:

"Passing up Montgomery Street yesterday afternoon, my attention was attracted by a little gentleman with a small moustache, who rushed hastily past me. Though slightly lame, he had passed me with a speed that may have been equaled, but for a man of his size could never have been excelled; and his look of frantic terror, his countenance wild, pallid with apprehension, as I caught for an instant his horror-stricken gaze, I shall never forget. I had turned partly around to watch his flight, when with a sudden shock I was borne hurriedly along, and in an instant found myself struggling and plunging in the midst of a mighty crowd who were evidently in hot pursuit. . . . There was no shouting,—a look of stern and gloomy determination sat on the countenance of each individual; and, save an occasional muttered ejaculation of 'There he goes!' 'I see him!' we rushed on in horrid silence.

"A sickly feeling came over me as the conviction that I was in the midst of the far-famed and dreaded Vigilance Committee settled on my mind; here was I borne along with them, an involuntary and unwilling member. . . . It was a dreadful scene. I am not a fat man, —that is, not particularly fat,—but an old villain with a bald head and spectacles punched me in the abdomen; I lost my breath, closed my eyes, and remember nothing further. On recovering my faculties, I found myself jammed up flat against a box, with my head protruding over the top in a most uncomfortable manner, and the weight of the whole crowd (amounting by this time to some six thousand) pressed against me, keeping me inextricably in my position. Here, for an instant, I caught a glimpse of a Stockton boat just leaving the wharf; then everything was obscured by a sudden shower of something white; and there burst from the mob a deep and melancholy howl, prolonged, terrific, hideous. . . . 'In the name of Heaven,' I gasped, 'what is this?' 'He has escaped,' replied a seedy individual, with a deep groan. 'What has he done?' said I. 'Who is the criminal?' 'Done!' said he of the seedy garments, turning moodily away, 'nothing—*it is the new collector!* He's off to Stockton.' The crowd dispersed. . . . I looked over the side of the wharf. I am not given to exaggeration. You will believe me when I tell you that the sea was white with letters that had been thrown by that crowd; for miles it was white with them, and far out in the stream, her wheels filled with letter-paper, her shafts clogged with dissolving wafers, lay the Stockton boat. On her upper deck, in frenzied agony, danced the pilot, his hand grasping his shattered jaw. An office-seeker had thrown a letter attached to a stone, which had dislodged four of his front teeth. . . . I walked up the wharf, and gazed ruefully on my torn clothing and shattered boots, which had suffered much in this struggle of Democracy. 'Thank God, O Phœnix,' said I, 'that you are a fool,—or what amounts to the same thing in these times, a Whig, —and have no office to dispense, and none to seek for.'"

This is delicious, but the "Return of the Collector" is not inferior in interest:

"Intelligence having reached the city yesterday morning that the new collector might be expected by the Stockton boat, at an early hour in the afternoon the crowd of office-seekers began to assemble, and by eight o'clock last evening the long wharf was so densely packed with human beings, that merchants and others compelled to resort thither were obliged to step from the corner of Montgomery and Commercial Streets upon the heads of the crowd, and proceed to their places of business over a living pavement. Much suffering having been caused by the passage of loaded drays and other carriages over the shoulders of the crowd, and many serious accidents having occurred to individuals, our worthy mayor, ever alive to the calls of humanity, throwing aside all political prejudice, caused planks to be laid over the heads of the assembly from Sansom Street to the extremity of the wharf, which in a great measure alleviated their suffering. There was no fighting or disorder, for so closely was the crowd packed that no man could move a finger; one unfortunate individual, who at an early stage of the proceedings had inadvertently raised his arm above his head, remained with it for hours immutably fixed in that position. . . . At half-past nine an electric shock ran through the vast assemblage at the sound of the steamboat's bell. . . . The collector disembarked, and in a few moments a procession was formed and proceeded in the following order to the hotel:

"THE NEW COLLECTOR

In a carriage drawn by two horses lashed to their utmost speed.

"All the male inhabitants (except one reckless and despairing old Whig), running eight abreast at the top of their speed.

"THE POLICE OF SAN FRANCISCO

"*On a dead run, and much blown.*

"Candidates for office in the custom-house who had known the collector in his early youth, ten abreast, bearing a banner with the following motto, 'Don't you remember the path where we met, long, long ago?'

"Candidates for office who had lately become acquainted with the collector, twelve abreast. Banner, 'We saw him but a moment, but methinks we've got him now.'

"Candidates who fervently wished to the Lord they could get acquainted with him.

"Candidates who had frequently heard of him, forty-five abreast.

"All the members of the Democratic party in California who did not wish for an office in the custom-house, consisting of one fortunate miner who had made his pile, and was going home on the first of the month.

"Gentlemen who had the promise of appointments from influential friends, and were sure of getting them. . . . This part of the procession was four hours in passing a given point. . . .

"Saturday morning, P.S.—'Truthful James' has just rushed up in a frantic state to inform me that the collector did not arrive last night after all. . . . I do not know that it makes any difference. If he did arrive, my report is all true now; if he did not, why, when he *does* arrive it will be all true then. Of course you won't publish this.

"PHŒNIX."

One wonders what Phœnix would have had to say had he lived to see Garfield persecuted by office-seekers.

Not long after the publication of these sketches in 1855, Lieutenant Derby was attacked by a disease of the eyes, which caused him such acute agony that his brain was at times slightly affected, and the closing years of his life were clouded and saddened.

He died in California in 1860, at an age (thirty-four) when it might reasonably have been hoped that the best work of his life remained still to be done, adding by his death another example to the many with which literary history teems of "how quick bright things come to confusion."

NOTE.—The writer's thanks are due to Generals —— and ——, and Major ——, of the U. S. Army, for the personal information contained in this article.

THE PRESENT POSITION OF TACTICS IN ENGLAND.

BY COLONEL W. W. KNOLLYS.

During the last fourteen years there has been a constant flow of books, pamphlets, magazines, and newspaper articles, and lectures on tactics; yet, at all events, as regards the handling of infantry, we have in this country not yet arrived at a solution which is accepted as satisfactory. However, for all practical purposes; the conditions of war have not substantially changed in the mean time. It may, therefore, be profitable to consider what is the present state of the question, especially as indicated by recent works on the subject.

There may be said to be two parties among those who devote their thoughts to, and have expressed their opinions on, tactics. The first party, which embraces men of very varied shades of opinions, finds their chief exponent in Sir Edward Hamley. The second party is represented by Colonel Maurice. In fact, these are the two champions in a controversy which may be said to be now commencing. The first party, while recognizing the fact that the great increase in the range, accuracy, and power of modern fire renders the Wellington tactics impossible in their entirety, still conceive that parts of them, and especially the principles of them, may be retained with advantage. The second party would break altogether with the past, and take an entirely fresh departure.

Sir Edward Hamley—if he is, as we believe, the author of the article in the May number of *Blackwood*, called "The Late Battles in the Soudan, and Modern Tactics"—deals with the two branches of the subject, viz., the tactics to be employed against regular troops, and those suitable for employment when engaged in war with savages. Let us begin by seeing what he says regarding the former:

"After the Franco-German war, many military reformers ran wild after what was called 'loose order.' And because the offensive tactics of the Germans, armed with their breech-loaders, which they used skillfully and well, were invariably successful against the French, armed with the Chassepot, of which they had not mastered the use, it was illogically concluded that breech-loading fire had increased the chances of the attack, and diminished those of the defense, in battle,—a conclusion which all subsequent experience has disproved. Our officers were accordingly taught by the drill-book to believe that by forming a battalion practically in four alternated lines, unprotected by skirmishers, in place of the closed line preceded and protected by skirmishers, it could advance over open ground with such unanimity from loss, although the enemy's fire was fourfold more powerful, that by a rush over that last two hundred yards they would be able to capture the enemy's position, though lined with rifles each capable of firing at least twelve shots, while the assailants were passing over that last stage of distance. . . . We believe that the true solution of the question will be found in the proper employment of skirmishers. . . . Skirmishers are troops who, not being intended for close combat, are employed to cover those who are so intended. They are independent of the attacking troops, whose front they cover, and may be at any number of paces' interval without deranging the attacking troops in their rear, behind whom they may rally after they have played their part. The object of employing skirmishers has been to oblige the enemy to show his hand, and to cause the advance of the line of battle in their rear by attracting the attention and fire of the enemy."

The writer then proceeds to point out that the value of skirmishers in attracting the attention of the enemy, and clouding the advance of their own troops with smoke, has increased with the introduction of breech-loaders; that scouts, being only ten or twelve per battalion, do not supply their place, and that the axiom that the fighting-line once engaged can never be withdrawn applies to the first fighting-line only, not to skirmishers.

His conclusion is expressed in these words:

"It seems to follow, therefore, that troops, destined to attack, whether formed in one closed line as of old, or in four open lines, should always be preceded by skirmishers in the old sense of the term. And this once established, we believe it would be found that the loss suffered by a closed line during its advance under fire would not be greater than that of a system, as now practiced, of open lines backed by small columns of reserve. And the closed line would possess the immense advantage of preserving the different company and wing commands unmixed."

Taking the article in *Blackwood* as a whole, it is apparent that though in the passage above quoted the writer offers four open lines as an alternative, he is in reality wedded to the old closed two-deep line of the Peninsular, and Alma. We cannot for a moment admit that the processional advance of the closed line is possible. In the first place, even in the days of short-range flint-lock smooth-bores which reduced the zone of fire to two hundred yards, it was only practicable for comparatively short distances, with highly-drilled troops, and under the most favorable conditions of ground. In these days, especially with inferior drill and young soldiers, it is simply impracticable, not to be thought of for a moment. At the same time, though the advance through the zone of fire in a closed two-deep line is no longer feasible, that formation is nevertheless the best for delivering the final decisive blow, and we completely indorse the following extract from the *United Service Gazette:*

"The old British two-deep line is the very best formation in which to overcome resistance, but owing to the destructive character, rapidity, and long range of modern weapons, it is impossible to cross the zone of fire in that order. Hence it is best to break up the line at, say one thousand yards, and to bring up the fragments with intervals successively to a spot about one hundred and fifty yards from the enemy, there to be pieced together again, so as to resemble the original line as much as possible. The object, therefore, is so to arrange the breaking up of the battalion when it starts for the attack, that when it is put together again the fragments, aye, and each individual, may as much as possible fall into the original place."

The author of the pamphlet written in answer to the article in *Blackwood* above referred to, admits that the two-deep line formation secures the best and greatest use of the rifle, but considers it proved that, in the face of practiced troops armed with modern rifles, "any closed formation is inadmissible from the losses it entails, until the enemy's resistance has been broken, or until he has been demoralized, from its not being able to obtain cover readily or easily, and from the want of power to move, inherent in closed line formation." We quite accept the statement contained in the first part of this extract as correct, but we fail to see that a mob of men are less exposed to fire than a closed two-deep line. Indeed, it is obvious that the "great swarms," "thick clouds," "dense lines, etc., of skirmishers eight or sixteen deep per pace," of which the author speaks at page 17 of his pamphlet, are more likely to suffer loss than a two-deep line; in the latter case, every man can use his rifle with effect, while in an eight-deep mob, only one-quarter of the men can do so. The author admits that "an extended line, if thick, is as vulnerable as a rigid closed line two-deep, but it is more mobile, can take cover more easily, and can make better use of the rifle during an advance." We cannot see how a thick mob can cover itself more easily than a regular line, unless there is a great distance between the leading and the rearmost men of the mob. It is a question whether there is not a tendency in the present training to induce too much taking cover, and too long lingering in it. To return to the question more immediately at issue. The author of the pamphlet says that a closed formation is inadmissible until the enemy has been shaken. That, however, is no argument against the employment of the two-deep regularly-formed line for the final charge. It is not proposed by the *United Service Gazette* to advance in line until the enemy's fire shall have been somewhat subdued, but only that as near an approach to regular two-deep lines as possible shall be employed after the artillery or the firing-line of the assailants shall have loosened the hold of the defenders on the position. The author of the pamphlet, in the pamphlet itself, and in a letter appearing in the *United Service Gazette* of 20th September, seems to us to base his objections to the plan proposed in that paper, and quoted above, on two arguments: 1. That, in the face of the murderous fire of the present day, you can only get the fighting- or firing-line to advance by the impetus given by successive waves of reinforcements. 2. That experience proves that all units are broken up in battle. The wave theory, as we may term it, was enunciated and adopted by the late General Skoboleff. But why should not a battalion in line, which it is intended to re-form, at the moment of dealing the decisive blow, in a two-deep line, be carried forward by successive waves? To us it seems that no difficulty exists. The battalion, in four large, or as many double companies, might assume the formation of a line of company columns of quarter company front, with intervals between the columns equal to a quarter of the front of a company. The leading section of each column should advance in extended order, and constitute the firing-line, the other sections constituting the successive bands of reinforcement. The first reinforcement would be thrown into the fight when the firing-line had arrived at about five hundred yards from the position attacked, for the assailants would not begin to fire probably at a greater range than six hundred yards, and for one hundred and fifty yards, at least, they could advance without serious losses, while a comparatively small number of men would suffice to do all the work needed at that distance from the rifle, viz.: unsteadying the enemy's aim. At five hundred yards the whole, or merely the front rank, of the second section, might be brought up to increase the amount of fire, supply the vacancies caused by casualties, and give confidence. The third section should be brought up somewhere between five hundred and two hundred and fifty yards from the enemy, while the fourth section should not be added to the firing-line when the latter has got as far as from two hundred to one hundred and fifty yards from the enemy, and should constitute the last wave. It will be remembered that the firing-line covers, from the start, only half the front which would be occupied by a battalion in a two-deep line. It must also be borne in mind that the firing-line has, to quote the author of the pamphlet, to submit to a loss of from thirty to fifty per cent. Let us take the larger number. It is evident, therefore, that by the time the whole battalion has been brought up, there will be—if the breadth of front has remained unaltered during the advance—a place for every one in a two-deep closed line. The men of each company, though the sections will have been broken up, will not, with exceptions so few that they may be ignored, be mixed up with those of other companies. If Colonel Macdonald's four-deep formation be adopted, even sections would be kept together. In either case the company leader would be able to exercise control over his men; for in the case of a company of ninety files the front would not exceed thirty yards; while by placing himself in the earlier stages of the fight, half-way between the firing-line and the rear section, he could, by signal or messenger, communicate his orders to all his section-leaders. No one would be able to appreciate so exactly as himself the right moment for bringing up the successive reinforcements, and to him therefore authority to throw them into the fight when he may think fit should be given. As a rule, however, the bringing up of the fourth sections, which constitute the final wave, should be left to the battalion commander. In the case of a single battalion being employed in the attack, or of a battalion on the right or left of the force attacking, troops intended to guard against an outflanking counter-attack should consist of distinct battalions following in rear. Distinct battalions should also be employed as reserves to cover the retreat of the first line should the latter be obliged to fall back. No part of the first line should be used for any other purpose than that of feeding the firing-line. If the assailants wish to extend the firing-line, or to make either a short or long turning movement, a fresh battalion should be brought into the first line. By adopting this system, every battalion, and part of a battalion, would have a single distinct function instead of as at present, a double function, as is sometimes the case now. It would have simply to move to its front. Hence the chance of the mixing up of companies, battalions, and even brigades, a mixing-up which continually occurred among the Germans in 1870, would be rare. We are constantly told that a frontal attack on a good position properly defended by steady troops is impossible, unless the defenders have been previously shattered by artillery fire, and flank attacks have, on the experience of the Franco-German war, been indicated as indispensable. Let us examine the question, and first let us see what the author of the pamphlet has to say on the subject:

"The war of 1870–71, besides showing the almost impossibility of reaching this distance by a frontal attack, showed that it was possible to do so by attacking an enemy's flank. Flank attacks have more chance of success, from the shape of the ground being less favorable for defense than that taken up as the front, from the preparation for resistance being usually less on the flanks than on the front, from the moral dislike or feeling of danger inherent in animal nature when an enemy threatens the flank or rear; and from the terrible effect of an enfilade fire. The sound of firing even, on their flanks or rear, often intimidates the defenders of a position, and causes their retirement. It may be laid down as a maxim, that when opposed to a well-posted and disciplined enemy, armed with the modern breech-loader, flank attacks are the only ones that have a real chance of succeeding. Flank attacks, of course, become eventually local front attacks, but the new front is weaker than the true front of the force; a flank attack, however, can only be carried out by superior numbers or superior generalship."

The war of 1870–71 did not afford conclusive evidence on the above subject. The French armies were generally numerically inferior to those of their opponents. The former being badly handled, were almost always outnumbered at the point of actual contact. The defensive is not suited to the French character, and their *élan* was not turned to account. The French were not skillful in the use of their rifles, and there was little "fire discipline" among them. The reserves were made little use of,—witness Gravelotte, where the Imperial Guard remained halted all day in a valley, instead of being brought up to enable Canrobert to resist the enveloping attack made on him. The French commander-in-chief did not exercise a close and continual supervision over the different portion of their forces, and a large proportion of the officers and men being strangers to each other, there was little mutual confidence. Hence the Germans were able to take liberties with their opponents, encounter risks, and reap results which, if their foe had been of a different character and equal in numbers, would have been impossible. We have yet to see how the style of fighting adopted by the Germans in 1870 would answer with a solid, well-organized foe possessing the steadiness of our troops; and it must be remembered that since 1871 there has been little really instructive war experience. As the author of the pamphlet correctly observes, "Flank attacks, of course, become eventually local front attacks, but," he goes on to say, "the new front is weaker than the true front of the force." It seems to us, that if the general commanding the defenders occupies a good position, strengthened by shelter trenches, and proportioned to the size of his army, he ought to have no difficulty in meeting—if his troops are well in hand —a flank attack with equal, if not superior numbers, for the assailants cannot be equally strong everywhere. Therefore, a direct attack, whether declared impossible or not, must be attempted, unless the assailant can by strategy cause the defender to evacuate his position without fighting for it. In these days of long range and accurate, rapid-shooting rifles, a flank attack, in order to reap full benefit from it, must be made by taking a wide circuit. In doing this, the flanking force must, to a certain extent, lose connection with the main body, and may, by a judicious combination of the three arms, be either crushed or cut off. It is urged on behalf of the wide flanking movements that, owing to the great range of modern rifles and artillery, the detached force can receive at a distance much support from the main body, and that the effect of an enveloping fire will be considerable. We are, however, justified in assuming that unless the assailants, weakened by the dispatch of a detachment to a flank, press the front and flank attacks simultaneously, the defenders of the position will, by lying down under cover of the accidents of the ground till the real attack be developed, be fairly protected from the enveloping fire. Accepting, therefore, the fact that the assailants will locally only—as regards the infantry—have to meet a front attack, we come to the question how their resistance is to be broken down. We fail to see how, if the ground is favorable to the defense, and has been strengthened by shelter trenches, the attacking party can do *much* by their fire to shake the defenders by expending ammunition at a distance. The author of the pamphlet says, "No battle has ever been won at long ranges; it is only the shortest ranges possible that are decisive." This is quite true, and, that being the case, we are inclined to think that much of the firing of the assailants is wasted. The defenders have a clear view, and, if their commanders know their business, they will have the range in front of the position marked. On the other hand, the assailants have no means of fixing the ranges, and, starting with uncertainty on that point, their estimates every moment become more inaccurate. Granted, however, that they get the exact range, say at one thousand yards, and retain the accuracy as they advance, what have they to aim at? A line of trenches or crest marked by a line of smoke, and the tops of men's heads. Clearly, few of the assailants' bullets will take effect, and the more that are misses the more confident and steady will the defenders become.

Even if the assailants find partial cover every now and again, and are thus able to aim steadily, is it likely that they will be able to do much execution, or to any appreciable extent shake the nerves of the enemy at ranges between six hundred and three hundred yards? As to firing when on the move, the only advantage will be that they will provide a slight screen of smoke, for the bullets will practically fly at random. In the attack of a really good position there will be few spots that will give more than partial cover to the assailants from the commanding position of the defenders, and the object is to get the attacking force through the zone of fire as quickly as possible. It is evident, therefore, that there should be little firing till a fairly good aim can be taken, *i.e.*, up to three hundred yards, for every shot, whether fired at the halt or when in actual movement, means a longer or shorter pause. On the morning of the third battle of Plevna, Skoboleff, as was his custom, told his soldiers how they were to attack. In the "Personal Reminiscences of General Skoboleff," by V. T. Nemerovitch-Dantchenko, translated by E. A. Brayley Hodgetts, his remarks are given as follows:

"Now, you look out, . . . use your eyes, my men; don't shoot blindly. March straight up to the redoubt without wasting powder. There is no mind in shooting. Shooting is all right when you are sitting behind embrasures, and are on the defensive."

At Tel-El-Kebir, Lord Wolseley issued a similar order, and desired his troops to trust to the lately decried "cold steel." Thus two experienced commanders have reverted to the old Peninsular method of attacking works. But a carefully prepared position, with either sharp crest, walls, banks, or shelter trenches, is, after all, for practical purposes, a large field-work; and the system suited to the attack of the one is applicable to the attack of the other. As then a frontal attack on either a position or field-work is rarely likely to succeed unless the defenders shall have been previously shaken, and as it is evident that the fire of the infantry of the defender can overmaster the fire of the infantry of the assailant, what is to be done? The only plan generally practicable seems to us to be to employ masses of artillery within effective shrapnel range, and then bring up the infantry in successive waves at open order till the two-deep line is put together again at two hundred to one hundred and fifty yards. At that distance the superiority of the defenders has greatly diminished. The defenders must either fairly show their heads and shoulders, in order to hit the assailants, who, lying down, do not practically expose more of their persons, or else the defenders, still keeping well under cover, are apt to fire high. In such a struggle, victory will probably fall to the lot of the most steady, resolute, and well-disciplined troops; for it becomes a contest of nerves. But the firing duel should not last long, and after the rapid discharge of three or four rounds the assailants should charge under the cover of the smoke, and decide the issue with the bayonet. In the majority of cases the defenders will retire before the actual position is reached, and the execution done by the bayonet will be small, but the moral effect of a closed line of men rushing on with a bayonet, and evidently meaning to use it if they can, will greatly shake the nerves and distract the aim of the defenders. When, however, the assailants shall have gained the crest of the position, they should at once halt and fire. The method suggested above is founded on the admitted principle that in attacking a wood there should be no delay in the open, and that every endeavor should be made, first to place the assailants on the same footing with respect to cover as the defenders, and, after equalizing conditions, to reverse them. When possible, advantage should be taken of night, in order to get quite close to the enemy's position without being discovered, as occurred at Tel-El-Kebir. It is not, however, to be anticipated that a European foe would perform its outpost service as inefficiently as did the Egyptians, and possibly the defenders would be provided with electric or lime lights. Besides, great nicety, and exceptionally favorable ground, are needed to enable the assailants' march to be so timed that they may arrive within two hundred or three hundred yards precisely at daybreak. As to an attack in the dark, the inevitable confusion will be less on the part of the defenders than on that of the assailants, while the example of brave men will not be seen by the latter, and cowards will be able to hang back without attracting attention. For the above reasons, night attacks by an entire army will rarely, we imagine, be undertaken.

As to the statement made by the author of the pamphlet, that "Experience proves that all units are broken up in battle," there can be no question that in the wars of the last thirty years such has generally been the case. That fact is, however, no argument in favor of helplessly putting up with this misfortune. We ought rather to endeavor to minimize what we cannot altogether prevent. That it can be sensibly minimized we feel convinced. The chief argument on the other side is, that in the Austro-Prussian and Franco-German wars there was a complete disintegration of units whenever there was severe fighting. The explanation is, however, that in the former war, the men, finding the old method of fighting impossible, unconsciously adopted the newer method, which their leaders, accepting, by degrees elaborated into a system.

It is for us to try and elaborate a system by which the advantage of extended order at the commencement of an advance may be combined with the advantages of regular order at the decisive moment of actual contact. "The task is impossible," say our opponents. Our reply is, "The task may be difficult, but there is no reason to suppose that it is impossible, or against trying to make it possible. If we cannot attain an ideal perfection, let us at least try and get as near to it as we can."

Before concluding this part of our article, we wish to say a few words about the defensive. The Germans are of opinion that the recent improvements in rifles on the whole tend to the advantage of the assailants, and strongly advocate the offensive. No doubt the assumption of the offensive implies moral or material superiority; standing on the defensive, the reverse. Neither can it be denied that the assailant can select his own point and time of attack, while the defender must remain in doubt as to when the real struggle will take place, and follow the lead of his opponent. With, also, the increased range, accuracy, and power generally of modern rifles and artillery, the assailants can avail themselves of concentrated and enveloping fire. On the other hand, a general on the defensive, if skillful, will expose few of his men to distant fire, reserving them for close combat. Thus the preliminary fire of the assailants will be, to a great extent, wasted. The defenders have in their favor cover, artificial or natural, a clear view of the front and flanks, an abundance of ammunition at hand, ranges previously marked out, and the advantage of discharging all their shots at the halt from one spot. As to the moral superiority involved in the offensive, that would not much affect steady, phlegmatic troops like British soldiers, who do not, like the French, trouble themselves much about being outflanked, leaving such matters to their officers, and concerning themselves only with the foe in the immediate front. Besides, it might, and indeed should always be explained to the troops that the defensive is only a preliminary to a vigorous counter-attack, when the enemy shall have been weakened by useless efforts to carry the position. Lord Wolseley clearly shows that in his opinion the defensive-offensive is the *rôle* best suited to a British army. Considering the manner in which the French troops were handled in 1870, and the numerical superiority of their opponents, the experience of the Germans in favor of the offensive does not count for much.

Of more immediate and extensive practical interest to British officers than the tactics to be adopted against a well-armed, well-trained enemy, are those suitable for employment against a savage foe, such as the Ashantees, the Zulus, the Afghans, or the Soudanese, for the reason that regular warfare is with us very exceptional, while a campaign against an uncivilized foe in some parts of the world may be considered chronic. The conditions of the latter are rarely the same, but they almost always resemble each other in the following points: The transport is difficult; the enemy generally act strategically on the defensive, but tactically on the offensive; our opponents vastly outnumber us, and, though badly armed and incapable of manœuvring, are formidable from their desperate courage and physical prowess. They require scanty supplies, and are therefore independent of lines of communication; owing to their great activity and perfect knowledge of the country, they are excessively mobile; they are treacherous, and well skilled in all sorts of ruses and ambushes. In our advance—when we do advance—we are not exposed to a destructive fire; consequently a dispersed order of attack is unnecessary, and we can obtain the solidity and confidence resulting from cohesion and propinquity. The men are also more under control, and more easily handled in close than in extended order.

In all descriptions of warfare, the great object is to obtain as large a development of fire as possible. When opposed to a European foe, a large proportion of our rifles are for a longer or shorter time silent, owing to the necessity of men being kept in the rear of the fighting-line, to fill up gaps in the front line and carry it forward when checked by the enemy's fire. In war with savages, little reinforcing during an advance is needed. In fact, of the three *échelons*, the firing-line, the supports, and the battalion reserve, one of the last two—preferably the reserve—may be suppressed. In fairly open ground, one British soldier would probably be overmatched by five savages, each of them, in most cases, more powerful than himself. Ten British soldiers, shoulder to shoulder, would, however, be a match for fifty savages, while one hundred would hold at bay one thousand savages, and the proportion of savages may be increased as the numbers increase. An important condition of success is, however, that the British soldier should be in close order; for the object of the savages would be to disintegrate our formed bodies, having succeeded in which, the superior activity and average strength of the former would tell. In dealing with savages we have to encounter this great difficulty, which is, that practically they have no baggage, lines of communication, or base, and that they can cover more ground in a day than we can. Hence they are able generally to select the spot on which to give battle, and a pursuit cannot, as a rule, be continued far. Again, they have no centres of vitality, such as towns, large expanses of cultivated lands, etc. If you can accomplish the difficult but by no means always impossible task of starving them, then there is necessarily an end of the campaign; but starving out savages is not only a difficult but a tedious affair. Generally the only way to conquer is to kill a large number of them. The object, therefore, is by surprising them, by catching them in a *cul-de-sac*, or by drawing them on to ground favorable for yourself, unfavorable to them, to cow them by inflicting heavy losses. This is indeed the most solid way of securing a lasting success; for their burnt villages can be soon built again, and the destruction of crops or the capture of herds, unless very complete, produces little permanent effect, while, on the other hand, by reducing the number of their fighting men you give an unmistakable proof of your superiority, and render them less capable of resuming the offensive. Sometimes savages persist in awaiting your attack. In that case it must be remembered that though it might be prudent to shake their firmness by a preliminary distant fire, it would be foolish to try and dislodge them in that manner, for they would only take up a fresh position. Your object should be to fight a decisive action, and to so arrange that, before they can escape, your rifles shall have been employed against them in as effectual a manner and for as long a time as possible at effective ranges, before they can take to flight. It is also well, while conducting the real attack, to dispatch strong detachments—keeping up their connection with the main body—to occupy positions from whence they can sweep with their fire the probable lines of retreat. As we have observed, savages have practically no lines of communication. At the same time, when once they have taken up a position they are neither skillful nor prompt in changing their dispositions in the course of an action. Flank attacks are therefore desirable when practicable. It may be urged that, owing to their superior numbers, flank attacks rarely are practicable. This is true as regards the position of the enemy taken as a whole; but portions of that position are frequently susceptible of being taken in flank, and, if any portion of the savages' line be pierced, there are at once two flanks exposed to your operations. One point must be insisted upon, which, obvious as it is, its importance has frequently been ignored by our troops in South Africa. We refer to the necessity of plunging freely into any bush which may be occupied by the enemy. In the earlier stages of our Kaffir wars, our soldiers have, attacking a patch of bush, hung outside the edge and hesitated to enter it. Troops under such circumstances should have it impressed upon them that the instant they enter the bush they are, as regards cover, on equal terms with their opponents, while by hanging about outside the edge the reverse is the case.

Frequently consciousness of immense numerical superiority of numbers, national conceit, or religious fanaticism induce savages to assume the offensive from the beginning. Even if they do not deliberately attack, they may be induced to do so by feigning hesitation or even simulating a retreat. It is important to decide what should be our formation under such circumstances. The following extract from the pamphlet to which we have already referred on a previous page lays down some sound principles, not only the general principle of warfare with savages, but also those on which we should base our formation when attacked:

"It is absolutely essential to use such formation as will afford the best use of the rifle, and to fire only at such ranges that no shot will be thrown away. There are two reasons for this latter principle; one is, that only a limited supply of ammunition is available, and so every possible cause of waste should be avoided; and the other is, that a savage foe, however punished at a distance, will never be deterred by it from attacking again, unless he is defeated at what he considers his best ranges, which are the closest ones possible. To prevent, by long-range fire, a savage foe from attacking, is therefore the greatest mistake possible; but if he will not attack, then, of course, his force may be broken, if the enemy is in the open, by a long-range fire of under five hundred yards, of a short duration, before the assault is delivered. The action at Tamai shows the necessity for a clear and sufficient field of fire with the modern rifle. The leading brigade was within twenty yards of the enemy's position when his rush took place, leaving no time for the enemy's attack to be met and destroyed by fire before contact was made, and a disaster nearly occurred. Not so with the rear brigade, which had a clear field of fire of over four hundred yards, across which none of the enemy was able to pass. This rear brigade fired volleys only."

Another reason urged by the author of the pamphlet for halting to receive an attack before intending to deliver one is, that the fire of the modern rifle is not so effective when fired advancing as when discharged at the halt. He deduces from this fact the following rule, which he impliedly considers applicable to civilized as well as savage warfare. The author says,—

"The true method of meeting an attack is to halt and meet it by fire. The bayonet is a feeble instrument compared with the bullet, and should never be resorted to sooner than necessary. The bullet makes us superior to a savage, the bayonet makes us his equal if not inferior to him."

If the bayonet is a feeble weapon in the hands of our men, let them be deprived of it; but to give them a bayonet and then tell them it is worthless, seems scarcely wise. That under certain conditions it can be used with great effect has been proved—without quoting Meeanee—in the Indian Mutiny, and especially in the late actions in the Soudan. Apart from the moral effect of a steady charge by a line of resolute, disciplined soldiers with leveled bayonets, in individual combat this weapon is most effective. Had some of our men in the Soudan, with minds confused by the pernicious teaching of those who affect to despise the bayonet, not hesitated as to whether they should fire or thrust, and ended by doing either one or the other in an indecisive way, our casualties would have been fewer. While, however, protesting against any attempt to lower the confidence of our men in the favorite weapon of all really warlike nations, we admit that, if possible, a savage foe should be tempted to assume the offensive, and that in that case we should meet his onset with fire. To obtain the greatest results from the latter it is evident that the line formation is the best. "But," say the writer of the pamphlet and those who share his views, "if the savages largely outnumber and try to outflank you, a two-deep line is inadmissible, and you must have recourse to a square." But even if till the moment of the enemy's charge the front and rear forces are formed in a line of company columns at deploying distance, with the flank forces in columns of fours or sections,—as suggested in the pamphlet,—it is difficult, even on favorable ground, to move with precision to keep dressing intervals and distances. Indeed, constant halts will be needed to set matters right. In addition, it scarcely ever happens that the attack is made on all four faces simultaneously. At the outside the enemy only advances on three faces. In that case the rifles of one-fourth of your men will be idle, while the slightest opening or confusion at an angle—as happened at Tamai—presents a breach by which the assailants will enter, and then the destruction of the entire square hangs upon a hair. When they do attack all four sides at once, a square must at once be formed, but with proper dispositions such a contingency will rarely present itself. In preference to the square formation, we would suggest—as does the *United Service Gazette* of the 1st September—*échelons* of battalions or half-battalions, with intervals sufficiently great to prevent one *échelon* from firing into another, and such distances as will retire the flank or flanks so far as to remove them from the danger of being passed. Take for example a force of six battalions of eight hundred bayonets each, and let us assume that the right flank rests upon some impassable obstacle, such as a marsh, stream, or cliff. In such a case, the following dispositions would, in our opinion, be effective. One battalion to be kept in reserve, formed in half-battalions, one half-battalion in rear of the centre of each wing, the other half-battalions to advance in *échelon* of half-battalion from the right, with intervals of fifty yards and distances of one hundred yards,—one hundred and fifty yards for the last two distances,—spaces being added to the intervals for the artillery or machine-guns. This would give—not reckoning artillery—a front of one thousand three hundred and thirty-three yards, or a little over three-quarters of a mile, and a depth of one thousand yards. We have fixed the distances for the tenth and ninth, and the ninth and tenth half-battalions at one hundred and fifty yards, as the attack on these would be weaker than the attack on the leading *échelons*. Supposing that there were four machine-guns and as many light field-pieces with the force, we would place a couple of machine-guns on the flank of the second half-battalion, a like number on the flank of the third half-battalion, and the field-pieces with an escort about one hundred or two hundred yards to the left of the tenth half-battalion. The object of so distributing the machine-guns and field-pieces is that the machine-guns would not be exposed to the first rush of the enemy, and could be wheeled round, if necessary, to take the latter in flank, should he try to turn the left, while the field-pieces, with their long range, could sweep the whole field of action. Should the enemy try to penetrate between the intervals of the leading *échelons*, he might be met by wheeling back a company, and by the reserve. With the latter should be a small portion of the mounted infantry or cavalry, the remainder being to the left rear of the field-pieces. The baggage should be placed some four hundred yards to the right rear of the left *échelon*, under an escort, and protected by an inclosure, if time admitted. In the event of both flanks being in the rear, the formation should be in double *échelon* on the centre. Of course, it might occasionally, especially with a small force, be well to form one large square with baggage in the centre, but whenever possible the square formation should be avoided, and when unavoidable, there should be as many squares—within reasonable limits—as possible. They should, however, give close material support, for Tamai exemplified the evil of having the two squares of Sir Gerald Graham's force at such a distance from each other as to be unable to combine their fire-action effectually.

Savages are much addicted to surprising their foe. Should it be learned that a surprise is in contemplation, it is wise not to exhibit any symptoms of having been forewarned. On the contrary, there should be a show of excessive security and exaggerated carelessness. At the same time, measures should be silently and secretly taken to have everything in perfect readiness. The moral effect of being met with a sudden and destructive fire at the very moment when the enemy were advancing in full confidence of catching our men napping, would be very great. Should night be fixed upon for the intended surprise, it would be as well to distribute along the front heaps of easily and quickly kindled brushwood soaked with oil, tar, grease, etc., to which fire should be set by means of electricity or in some other way just as the enemy reached them. The attackers would thus be visible, while the defenders remained shrouded in the darkness. No pursuit should be attempted till daylight, for at night our men would be apt to fire at each other, while they would certainly fall into confusion and get scattered, thus losing the advantage of drill, discipline, and cohesion. Many savage races never attack at night; others frequently do so. It is necessary, therefore, to become thoroughly acquainted with the habits of your opponents in that respect. Should they be addicted to night attacks, it might sometimes answer—if you are not intrenched—to move after sunset to a spot on the flank of the anticipated line of advance, thus turning the tables on the foe. If the enemy belong to a race averse to night operations, it may sometimes be as well to attempt to surprise them, provided that the ground be favorable, clearly marked, and have been carefully reconnoitred. In that case the actual attack should be made a few minutes before dawn. It is at that time the coldest part of the twenty-four hours, and the enemy, with their heads enveloped by cloths and half torpid, are less vigilant or capable of making resistance than at any other time. This is certainly the case with the inhabitants of India. It is a curious fact that no enemy ever give their opponents credit for possessing as much enterprise as themselves. Consequently, a foe addicted to night attacks or surprises, when at a distance, is much disconcerted at his own devices being anticipated. In all irregular warfare, especially when engaged with savages, the great difficulty is to guard the line of communication. This line is often very long and much exposed to desultory attacks, and the best way to defend it is to establish a chain of posts along it. To enable these to be held by small garrisons, and thus avoid the frittering away of troops needed in the front, the art of fortification must be brought into play. The great object is to limit work to that which is absolutely necessary, and economize both time and resources. Savage races have rarely weapons of any great penetration; consequently a parapet of slight thickness and height is sufficient. Also, as no prolonged scientific siege is to be feared, the trace may be of simple character. Stockades are generally objectionable, as being liable to be set on fire, unless made of green sappy wood. The great point is to hinder the enemy from coming to close quarters in a dense body. To accomplish this object, a ditch, not less than twelve feet broad and six feet deep, should surround the work. To prevent the assailants from climbing up from the ditch, rough fraises pointing downwards should line the escarp, and as an impediment to leaping the ditch, crows-feet, or sharp-pointed pickets, should be placed on the berm, and also in the ditch. The crest of the parapet should be surmounted by a thick row of bushes, in order to conceal the defenders. The advantage of this precaution is, that not only will the assailants have no distinct object to aim at, but also a few men by firing first from one place, then from another, can give the impression that the garrison is strong. Wooden V-shaped troughs should be laid on the parapet as guides to firing at night. Outside the ditch it is desirable to construct wire or cord entanglements concealed in the grass; also fougasses or small mines two or three feet below the surface. With these should be mixed some dummy fougasses, all, both false and real, marked by little heaps of loose earth surmounted by small flags. An opportunity should be taken of causing one or two of these real mines to explode in the presence of the enemy, so as to let them know what the flag-topped heaps of earth represent. This will cause them to avoid the dummy mines also. Bonfires, as suggested in a previous portion of the article, should likewise be arranged outside the circle of mines, so as to expose the enemy to view should they attack at night. Above all, the ground for some distance should be level, and cleared of anything which could afford cover or concealment to an attacking force. Economy of men and great rapidity of fire for a few minutes being the main essentials, every post should be provided with a couple of Nordenfelt rifle calibre five-barrel machine-guns. As far as possible the chain of posts should be in signal connection with each other.

Reconnoissances in force should always be conducted by a force the main body of which consists of Europeans. Friendly natives may, however, be employed with advantage as auxiliaries. In small scouting expeditions natives alone should be used, as their superior activity, cunning knowledge of the country, acquaintance with the habits of the enemy, and power of concealing themselves make them more fit than Europeans for work in which mere courage and good weapons are of comparatively little value. Money can purchase spies all over the world, and it is cheaper in the long run to expend cash than men's lives in obtaining information. Much may also be done in the way of playing upon the instinctive suspicion and jealousy of native chiefs and tribes, and thus sowing dissension among them. This may be done in many ways. For example, the villages and possessions of one chief or tribe may be ostentatiously spared; or overtures, accompanied by presents, may be made to persons of rank or influence. These may be thoroughly loyal to the cause of their countrymen or allies, yet the very attempt to conciliate them will often render them objects of suspicion. The spreading of false reports will frequently produce the same effect. Again, personal jealousies and private objects should be played upon. As diplomatically the chiefs and men of note should be the principal objects of attention, so in actual fighting every endeavor should be made to shoot them, for cohesion is maintained and examples of daring set among savages, by a very limited number of individuals, and these disposed of, the mass of the tribe become comparatively harmless.

We will conclude this article by adding a few general rules not hitherto given, or insufficiently touched on. As we have said above, you cannot produce moral effect on savages in the same way, or by the same means, that you produce moral effect on civilized nations. At the same time, it is not impossible to produce a moral effect on even the wildest savages. They are fully aware of the advantages they possess in superior numbers, activity, and mobility, of their comparative independence of lines of communication, supplies, and other requirements of an organized force. Their numbers may be met with by skillful dispositions, combined action, cohesion and rapidity, effectiveness and concentration of fire. To secure cohesion, combination, and discipline, all difficult to obtain in a broken, wooded country, there should be a permanent organization, not only by sections but also by squads, and even, as in the case of the third battalion Sixtieth Rifles, during the Zulu war, by fours, the men of which should, on duty and in action, be always kept together. To obtain the greatest moral effect from fire, long-range fire should be quite exceptional, and it should be impressed on the troops that they should deal with savages as they would with tigers,—*i.e.*, never fire unless certain of not only hitting, but dropping the foe. On the same principle, the commander should never, if he can avoid it, give battle unless sure not only of inflicting defeat, but also annihilation. Above all, the main point is, that while retaining all the advantages of superior discipline, manœuvring power, and armament, you should, by every means in your power, put yourself in other respects on a level with the enemy. Adopt as far as feasible such a method of carrying on the campaign as will enable you to move as rapidly and for as great distances and as unencumbered as the enemy. Let the men be lightly equipped, reduce the baggage to a minimum, utilize the resources of the country to the utmost, and especially avoid carrying artillery with you; machine-guns are much more effective at close quarters, and are much more easily transported. Especially should you meet every blow with a counter-blow. If the enemy try night surprises, retaliate in the same manner; if they employ stratagems or ambushes, you, in your turn, should employ ambushes and stratagems. The golden rule of all is, however, never hesitate to assume the offensive, however inferior in numbers you may be, unless by simulated fear you wish to draw the foe on to ground where you can fight to better advantage. One word in conclusion: disasters at the hands of savages are, alas, not unrecorded in our military history. In the event of a disaster, imitate the ancient Romans, and at once increase your audacity and pretension. An enemy is never so liable to defeat as when he is enjoying the triumph of a victory. Savages especially celebrate their success with festivities, and excess in eating and drinking, and are never so wanting in precaution as at such a time. Then is the moment for a daring assault.

THE END OF A GREAT NAVY.

BY VICE-ADMIRAL JURIEN DE LA GRAVIÈRE.

(Translated from the *Revue des Deux Mondes*, Nov. 1884, by JAS. DUVAL RODNEY, Esq.)

THE CHAINED GALLEY-ROWERS.

WE are apt to find too much fault with our epoch. It has its bad sides, but we must admit that the human race would gain nothing by going back two or three centuries. Above all, the condition of the sailor has improved. The abolition of corporal punishment, as it deprives the officer of his brutal methods, elevates the subject of authority himself. The horse constantly beaten becomes readily restive. It is not, however, on sailing-ships and transports that one notices in all its pristine ferocity the horrors of a discipline which resisted, thanks to the force of habit, so well any attempts at mitigation. On such vessels the intelligence of man is taken into account; it is not required that by the harshest kind of treatment he may be reduced to a mere machine. On the galleys, however, it is different: there the only requirements are the arms of the slave; the only thing sought for is his muscular action. To carry that to its highest point is the object to be attained, to reach this the cruel treatment is applied which offered a hideous spectacle to the world for three hundred years. Accompanying her husband to Marseilles when he went there as Governor of Provence, Mde. Le Grignan had an opportunity to witness the galleys. Thoroughly overcome by the noise of the artillery and the "hou hou" of the captives, she did not hesitate to express her impressions to her mother. Unhappily, we only possess the answer of Mde. de Sevegné to this letter. "I should be glad," wrote the spiritual marquise, "to see that kind of hell. Men groaning day and night under the weight of their chains." This was not seen even then everywhere. Even in the seventeenth century it was requisite in order to give one's eyes such a feast to brave the dangers of the Rhone, the long and perilous trip to the South.

The armament of a ship of war, and more particularly that of one propelled by oar, has been so expensive in all time that no country undertook more than to defend its merchant service.

In the Mediterranean in the sixteenth century no princes undertook to have an aggressive navy. Even those whose properties bordered on the sea were content with what they required for their personal wants.

The merchant ships did all that was expected in the way of commerce. They were sent out both to friendly and unfriendly ports if the protection was assured. They received freight and they paid a good dividend to the owner, who at the same time watched the sails and the helm carefully lest they should be stolen.

It was in this way that Scipio passed into Africa, he seized the merchant service of Sicily. The Prince of Orange and the Duke of Alba did the same thing; the French, in the time of Philip the Fair, had given them the example in Normandy. As a matter of course you can always have transports if you pay for them, but it is necessary in order to obtain vessels of war to prepare them in advance.

In the month of September, 1691, M. de Bailly de Noailles called together at Marseilles what might be called now a convention. M. de Noailles was the superintendent of the galleys. The council comprised, besides M. Bailly de Noailles, M. de Montmont, general superintendent of the galleys, M. de Bailly de Bethomas, first officer of the squadron, M. de Bailly de la Breteche, M. de Montalino, M. de Vincus, all three chiefs of squadron, M. de Chevalier de la Pailleterie and M. de Chevalier de Rance, captains of galleys. Messieurs J. B. Chabut, Louis Chabut, and Hubacq, engineers, presented their reports; the council after having listened to them fixed the following dimensions of the galleys: length from stem to stern, 46^{m} 777; width, 5^{m} 847; depth, 2 328; length of oars, 12 metres,—which would be in our measure about length, 150 feet; width, 20 feet; depth, 10 feet; length of oars, 39 feet.

The length of the hull, so to speak, if we include the outside ornaments, would be for the galleys of the seventeenth century about fifty-five metres (say one hundred and seventy-five feet), about the size of an old seventy-four. The frigates which were the naval warriors of the first empire were but forty-seven metres (say one hundred and fifty feet). But the proportions between the length and breadth were far from the same in sailing-vessels and those driven by oars. For the ship we have at least a fourth of the length for width; the galley is at least five times as long as wide. The difference is more marked if we consider the depth of hold of the two. The ship has a deep hold; the galley does not measure more than eight feet between the deck and keel. In other terms, to use an old expression, the one is a round vessel, the other is a long one. The first takes, by reason of the elevation of its cut-water, the generic name of haut-bord; the galley is always bas-bord.

Let us take a galley of the sixteenth or seventeenth century as a specimen: it is low in the water, long and sharp, carrying a crew of about four hundred men, with two months' provisions and twenty-three tons ballast, armed with one 36-pounder, two 8-pounders, and two 4-pounders, to say nothing of a dozen swivel-guns placed on the gunwale-rail. This ship is moved by fifty oars, and does not, in her passage, displace a yard of water.[1]

Those who look for the first time at the *personnel* of a galley, wrote Barras de la Penne in 1713 (he was a captain of one of the corps for forty years), are surprised to see so many people. There are thousands of villages in Europe which do not contain so many inhabitants; but what is more astonishing is to find such a number in such a small space. It is true that most of them cannot stretch themselves out. They place seven men on each bench; that is to say, in a space ten feet long by four feet wide. They are so packed away that you can see nothing from stern to bow but the heads of the sailors. The captain and the officers are not much better off. Their refuge is the poop-deck, and their accommodations one is tempted to compare with the tub of Diogenes. When the seas of the Lybian Channel overtake the galleys, when the north wind howls along the coast, or when the Syrian sirocco dampens the passengers with its deadly moisture, all these make the modern galley a perfect hell. The lamentation of the ship's company, the shrieks of the sailors, the horrible howling of the convicts, the groaning of the timbers, mixed with the clanking of the chains and the natural noises of the storm, produce an effect which will terrify the bravest of men. The rain, the hail, the lightning which come with such storms, and the waves breaking over the deck, add to the horror of the situation. Whilst it is not the usual thing to be very devout on a galley, you can see many praying to God, and others making all kinds of vows to their special saints. How much better it would be if these would not forget God and the saints as soon as the danger is over. Even the calm has its inconvenience. The horrid smells are so powerful that you cannot withstand them, despite the fact that you use tobacco in some shape from morning until night. There are also in a galley certain nasty little beasts who torture the inmates. The flies hold their empire by day, the bedbugs by night; the fleas and lice both by day and night. No matter what care can be taken, you cannot expect to be free from annoyance; these fearful vermin respect none, neither cardinals, ambassadors, nor even crowned heads.

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[1] Here follows in the original article a list of the names of the different parts of the vessel as substituted for the French by the Argo dialects. The French philologists may find it of use, but under a necessity to condense it has been omitted.—TRANSLATOR.

It is to one of the French kings, either Charles VI. or Charles VII., that credit must be given for the creation of galley service composed entirely of captives and criminals. Does it not seem more probable that the odious custom had been handed down directly from the Levant? The Turks and the soldiers of Rhodes made war without mercy. They were most likely to put the oar into the hands of their prisoners. Whatever did it, it is certain that much before the end of the fifteenth century a complete revolution took place on board of galleys. A new phase commenced.

"Roger," said Don Pedro III. to his admiral, Roger de Lania, when he sent him to attack the fleet of Philip the Bold, anchored in the Bay of Rosas, "experience ought to have shown you how easy it is for Catalans and Sicilians to succeed in sea-fights with the Provençaux and the French." By what right did the king of Aragon speak in that way of French sailors? Up to the time when Charles VII. proposed to create with a standing army, a national navy, the kings of France had not armed their galleys; they had hired them from those who had. Galley-slaves, archers, and men-at-arms all were furnished to order. At last, on the 10th of December, 1481, Provence was reunited to the crown of France by the gift of Renè d'Anjou. Palamêde de Forbin, Marquis de Solins and Viceroy of Provence, took at that time the title of General of the Galleys of France and Admiral of the Levant. From that day we can say that the French navy existed. The establishment of that great navy, which has had its days of trial and its years of glory, coincides with the transformation of the ship with oars, especially with the transformation of their equipage.

Condemned in 1701 to serve in the galleys of France on account of being a Protestant, Jean Martelle de Bugerac died in 1777 at Galenburg, on the Gueldre, at the age of ninety-five. He seems to have had (to use a common expression, though quite in place here) "his soul riveted to his body" (*l'âme chevillée dans le corps*). "All the convicts," he says, "are chained six to a bench; these benches are four feet apart, and covered with a bag stuffed with wool, on which is thrown a sheepskin. The overseer, who is the master of the slaves, remains aft, near the captain, to receive his orders. There are two sub-overseers,—one amidships, the other on the bow. Each of them is armed with a whip, which he exercises on the naked bodies of the crew. When the captain orders the boat off, the overseer gives a signal from a silver whistle which hangs from his neck. This is repeated by the two others, and at once the slaves strike the water. One would say the fifty oars were but one. Imagine six men chained to a bench, naked as they were born, one foot on the foot-rest, the other braced against the seat in front, holding in their hand an oar of enormous weight, stretching their bodies out, and extending their arms forward into the backs of those before them, who have the same attitude. The oars thus advanced, they raise the end they hold in their hands, so that the other end shall plunge into the sea. That done, they throw themselves back and fall on their seats, which bend in receiving them. Sometimes the slave rows ten, twelve, even twenty, hours at a time, without the slightest relaxation. The overseer, or some one else, on such occasions, puts into the mouth of the unfortunate rower a morsel of bread steeped with wine to prevent his fainting. If, by chance, one falls over (which often happens), he is beaten until he is given up for dead, and then he is thrown overboard without ceremony."

Shall we not be (in reading this fearful page, written by an author who could say, like the ancient martyrs, *Quod videmus testamur*) of the mind of Sancho Panza? We seem to be veritably in an enchanted country. The true enchantments are those things which happen here, and not those which that celebrated hidalgo Don Quixote so often mentioned to his man. "What have they done that they should be beaten so severely?" said Sancho; "and how does it happen that the man who walks about with a whistle in his mouth has the right to beat all the rest? This ought to be hell, or at least purgatory." For the honor of humanity, let us hope that Jean Martelle exaggerates. The interest of the captain, if he were the roughest and the most cruel of men, would counsel him to manage the slaves so to avoid such extreme harshness. One can only see the vestige of some barbarous corsair, which gives to the whip of the convict overseer such ferocity.

"A signal from Fort Monjwich," cries out the sailor on watch. They had discovered from the fort that there was a strange vessel with oars on the western side. The general (for we are on board of the galley of Don Louis Colonna, Comt de Elda and commander of the Catalain galleys at the epoch when Charles V. came to visit Barcelona) made a bound from his seat to the centre of the boat. "There, my boys, don't let that boat escape you," he says; "it must be an Algerine pirate." "*Sarpez le fer*," roared out the overseer as he began to lay his lash upon the shoulders of his crew. The galley made headway, and soon from the captain's bridge could be seen the size of the stranger.

It was a galley of forty or fifty benches. The pirates were not deceived as to the character and the intention of the Spanish boat. They expected to get off by reason of their light equipment, but they were mistaken; their pursuer was one of the fastest boats on the sea, and the pirate was being overtaken hand over hand. The man at the helm was disposed to surrender,—he looked forward to a new commission, and was not inclined to offend the commander of the Christian galley, —but unfortunately, two *therakis,*—who are those who are so called because they are hashish-eaters—these who were on board with a dozen Turks, fired into the Spanish galley and killed two soldiers. The captain in a fury gave the order to board. The overseer in executing this order miscalculated his speed; the pirate, instead of being caught, glided by, missed by the grappling-irons. The Spanish boat must describe a large circle to get on the track again. The corsair meanwhile hoisted her flag, raised the mast, and put off with the use of both sails and oars. But it was no use; the enemy soon overtook her, and this time the overseer regulated his approach more accurately. He made fast to the pirate, and the Algerines were caught as in a net. Cervantes knew as well as any one the discipline of the galley; he had been there; he returned maimed from Lepanto, where he lost the use of his left hand for the glory of the right. Let any one read then the chapter which relates to *lo mal que le avino a Sancha Panza con la visita de las galeras.* You can understand, then, better how the power of Charles-Quint could not protect his border from the barbarian pirates. The belt of half-ruined towers exists to-day to show in what state of disquiet the population of the banks of the Mediterranean lived at the end of the sixteenth century. The Algerine corsair braved the master of Flanders, the conqueror of Italy and the Indies, to the very entrance of his ports. Without Charles X. and his brave ministry, the Duke Polignac, General Bonmont, and M. de Haussey, the Mediterranean would not be quiet to-day. The conquest of Algiers has been an incomparable service rendered to humanity. Immortal honor to those who accomplished it; glory and encouragement to those who have carried out the consequences. We are always for French Africa,—or should we say the African France,—that magnificent establishment, to our mind the most glorious work of the nineteenth century.

Large salaries might perhaps induce sailors and soldiers to enlist upon galleys, as is said by the captain of the Santa Lucia in his celebrated work, published 1614 under the title l'Armata Navale, but it would be difficult to persuade a man who was free, to take an oar, to commit himself to the slavery of the chain, the bastinado, and the multiplied sufferings of the galley-slave. If the stupidity of certain vagabonds, if the abject vices of others, did not place them in the way to sell themselves, there would be few men who would voluntarily submit themselves to such a miserable life. It would have been difficult to gather up a good crew without much effort; it would be requisite to employ certain means not used in ordinary circumstances, and which perhaps condemn those who, misjudging the public perils, are ready to throw off the restraints of a conscience not too delicate already. When Christians expose their lives and fortunes in fleets to combat the enemies of our faith, is it not just that the wicked disturbers of the public peace should be called upon to contribute by their chastisements to the profit of the state?

Each age has its conscience. The conscience of the seventeenth century was not ours, and it would not be fair for us to judge with our ideas the conduct and the violent proceedings which were justified by the best minds of that age.

The best way to obtain galley-slaves, says Captain Pantero Pantera, is to induce the judges to expedite their criminal cases, to commute all punishments, as well that of death as that of the mutilation of a member, even fines, to a certain term of service on the galleys, naturally proportioned to the gravity of the offense. Those who are condemned to death should be chained to the oar for life; those who ought to be able to pay a sum of money, and who by their birth and lack of physique are not handy with the oar, ought to be made to buy substitutes from among the class who are attainable either as slaves or thrifty freemen.

The prince should take prompt measures, and the most rigorous orders should be issued in all his towns, his castles, and his domains, letting the worthless people know that after a short delay all who had not disappeared would be handed over to the service of the king's galleys. Bold and brave officers would carry out these measures, and when they find those who have no employment, or do not follow their trades, they take just such men and put them in the chains, thus doing the prince a double duty, providing men for the king and purging their countries of all worthless trash. The authorities did not hesitate to take in all who were for any reason down in the world. With a dash of religious furor all were swept into the net, and none could deny that, repenting of his sins, many a sinner has rowed himself into a happier next world.

The *press-gang*, so long used in England to recruit the navy,—that arm of the service which, on an urgent occasion, an act of Parliament would give to the officers of the crown,—did it differ much in its methods from those alluded to by Captain Pantera? It is horrible, but it is good, said Admiral Napier in 1839. This system existed, the captain admits, by means less violent, means more costly perhaps on the other hand, to assure the service of the rulers. They could for instance open the gambling-houses in all cities, particularly those which are on the sea-coasts. It was thus the pope's galleys were kept full in Naples, Genoa, and Sicily. The rulers would send men of good manners and clever, who would lend money to those who wished to gamble. There was no fraud. The unfortunate losers discharged their debts by engaging as *buonovoglie* (volunteers). Many a young man has been seduced, by ease of the loan, to bind a chain upon his foot. This was of all manners the most incredible to recruit the galleys. Everything went on without violence, and the victims gave themselves willingly to the snare. We don't see why this method, which pleased Captain Pantera, shocks us more than any other. I should prefer the third and last means of filling up the benches, as suggested by that writer. They send a division of galleys well armed, and in the course of the trip they reach the Isles, where they can pick up what men they want; the Grand Duke of Tuscany does not take them any other way. He has so many slaves that he is forced to lend them to other princes. These slaves were not Turks, but were Greeks. In 1570, the Senator Zane, general of the Venetian fleet, could not by any other means replace the men he had lost. He sent out an expedition under Marco Quirino, and Marco acquitted himself with such zeal that he is remembered by the Greeks of the Cyclades up to this day.

Our kings were more honest than the doges and the admirals of Venice; they did not steal their slaves, they purchased them. A Turk was worth in the seventeenth century from four hundred to four hundred and fifty livres, cash. These slaves we are told were extremely vigorous, of great endurance, very tall; much better suited than the convicts to serve as bow or stroke. It is probably from the galleys of Louis XIV. whence we get the proverb, "Strong as a Turk." The Grand Seigneur unhappily learned of the unworthy way in which his Most Christian Majesty, his ally, was manipulating the privileges which the French had enjoyed since the time of Francis I. He was very angry, and the Marquis de Villanova, the French minister, was threatened with imprisonment. In order to pacify the sultan, the king promised to set all the Turks at liberty. You could not buy any slaves after that in the Constantinople market, except Russians, or a few negroes from Guinea, or Moors. The sultan cared nothing for the Moors; unfortunately, they were of less value than the Turks. Our captains believed generally, if we can credit their archives, that they were "the greatest rogues in the world." This petty thieving was the most odious vice on board the boats, for it spoiled the cordiality of the relations between the different benches. It was of the highest necessity to continue to punish for the thefts which took place, in order to keep up confidence among the crew. The confidence was so marked that formerly the men kept their money in their water-jugs. Captain Pantera drew the same picture a century earlier of the future subjects of French Africa. The men of Barbary are of low character, deceitful, seditious, whom it is necessary to watch always; they are ready at any time to kill their masters. Without being as severe upon the Barbary men as the two captains, we are compelled to admit that the Algerine cabin-boys who were in our squadron on the Mediterranean showed themselves in competition in behavior, docility, and culture much inferior to the Cochin China boys who were apprentices in the same vessels.

The brother of the great minister Colbert, the founder after Richelieu of the French navy, who made a campaign in Candia in 1666, wrote to his brother, "As to the galleys, there are only the convicts who serve well. The *buonovoglie* nevertheless offer some advantages; first, they spend their pay on the boats, and in this way contribute to the well-being of the crew. Moreover, during a fight you can arm them and trust them. On board the Maltese galleys the officers look to them to have an eye on the Turks. They treat them with a certain confidence and permit them to walk about with only a manacle upon their leg, and only put the chain on during the night. Lastly, they only cut their hair simply and permit them to wear their moustache." Despite all this kindness the rulers found it hard to get enough of these free-will rovers; they were only to be found among the Spanish and Neapolitan people. The best, if not the only way to get recruits with some assurance of their usefulness on the benches of the galleys, was still the perversity of the human race. The criminals formed the best part of the crews, and what crimes in the opinion of those times were more worthy of punishment than rebellion? Lausac, the admiral of the French fleet in 1577, captured in front of Brouage, in a naval fight, six hundred Huguenots. He placed them at once in the galleys, but not all; those of sufficient importance he simply beheaded. This summary condemnation to the galleys passed then for an act of clemency. The Marquis de Santa Cruz, in 1582, showed himself much more rigorous than Lausac. When he conquered the adherents of Don Antonio, he treated his prisoners like pirates. Eight hundred French soldiers, which the fortune of war had thrown into his hands, were butchered at the same time with the unhappy Portuguese, victims to their national cause. Such was at that epoch the justice of kings. Let us hope that the justice of the people has more humane methods. Both should be reproached in separating pity from victory. In December, 1676, the efficiency of the galley system in France found itself considerably reduced; it had fallen to the figure of forty-seven hundred and ten men. The zeal of the courts, aided by Colbert, was scarcely able to remedy the evil. Our magistrates were far from being indifferent to the interests of the king, and Colbert could not justly call them soft-hearted. The courts did all they could. Why, then, did this service of the galleys show itself beyond relief? In 1713 this noble service, so particularly esteemed by gentlemen, died of consumption. There is need, wrote Barras de la Penne, to understand the grievances of a body which sees its end approach. The end has been coming for years in the galleys. Inaction, poverty, mortality have very much weakened our system. The great number of liberties granted, whether to convicts or to slaves, have more or less contributed to this destruction. From the moment clemency was introduced it was necessary to lose all hope. We have done forever with our navy of oars. The last remains of the Old World have fallen down. In 1753 the final blow was struck. Fifty-two Protestants were in the galleys at Toulon,—forty-three condemned for life, nine for shorter periods. They were pardoned at the instance of the Count d'Ottonweid, a providential agent whose name we have vainly sought for in all the almanacs.[2] Those pardoned were mostly old men, and preachers of the Reformed faith. The most heinous offense appeared to be a marriage or a sermon, a book, or a convention in which the criminal was an actor or a participant. These were certainly grievous offenses, and the heart is relieved at recounting them. Religious fanaticism ought not to be blamed; the intelligent critic of to-day puts the responsibility where it belongs. Reasons of state pursued, in the case of Protestants, less the heretic than the factious citizen. Since the day we quitted the Hercynian forest, Christianity has singularly modified our savage instincts. It may take several generations to make the transformation complete. Whatever means may be employed, it is not so easy to change a wolf into a lamb.

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[2] On pages 66 and 67 in the original article will be found the names and ages of many of those pardoned Protestants, omitted as unimportant on account of lack of room.

In Greece they did not undertake to stimulate the action of the rower except by the voice. Even the slaves have a share in this general immunity; not, as we are told by Eschines, because the legislature is interested in the slave, but the better to impress the value of respect in free persons it is good to extend that respect even when liberty ceases. The Roman had been brought up on the brutality of the lictors, and the *jussio* (mandate) was soon followed by the *putiscula*s (the rod). Sailors, said Alphonso, the wise king of Castille, in 1261, ought to be expeditious in what they do, as the sea itself is so active in its nature. General Bonaparte on his vessel "L'Orient," which carried him to Egypt, thought highly of the merit of the cat, and did not conceal it, but he nevertheless would not have admitted the necessity of any one laying a hand on his soldiers. The galley-slave, Captain Pantera observes, willingly avoids fatigue and seeks repose. To excite him to do his duty it is necessary to use the rod as well as the whistle. In using rigor, the overseer is better obeyed, and the service improved, for the fear of the blows is the principal cause of the good conduct on board the boats. But, adds the judicious captain, one is wrong to recur constantly to corporal punishment; it should be used only at intervals and with great discretion. The overseer who maltreats his crew without reason, and who irritates them imprudently, as I have seen inconsiderate men do, can throw his convicts into a state of despair. The wretches then seek death as a means of escape from their woes, and obstinately prefer to die rather than budge. The punishment should not exceed proper bounds and pass into cruelty; one should never be charged with having a private resentment, love of gain, desire for brutal vengeance, or any other mean motive. Outside his duty the overseer who understands his task behaves kindly towards his crew, he helps them, and a caress or two bestowed, if it does not lapse into familiarity, may cause him to be looked upon as a protector or a father, recalling to each that after all it is the same human flesh, and that same flesh is full of misery.

The human race has suffered much since the commencement of the world, and pity has come slowly down from the summits of Golgotha. The galley-slave was too difficult to recruit, his service too important, that he should be exposed to cruelty so that before the time fixed by nature his precious services should be lost. Let us consult Captain Pantera on the subject. No one knows better than he how to reconcile the incontestable rights of the convict with the care and duty of the official. Plenty of men will tell us, says he, that to prescribe and give remedies to sick slaves is like throwing your money into the sea.

There are, according to such objectors, too many privations, too much misery on board of a galley, to permit the physician to do any good. They pretend that where you find a sick *forçat* he is either shamming or dead. This is no well-founded opinion, it is a suggestion of meanness, of avarice. Good care with wholesome remedies can ever, on these galleys, keep the crew in good health. It is only requisite that the doctor be able and the apothecary honest. Many a patient who should be cured is made worse by a doubtful potion or worthless drugs. How many expeditions full of hope have been frustrated by sudden epidemics? The fleets of galleys were more subject to these visitations than any others. On board a galley the slave is as it were in prison; he eats almost always salt food, often spoiled food; he drinks nothing but water, often bad water; sleeps but under the canopy of heaven, either on his oar or between the benches. Exposed to all kinds of weather, he is also subjected to the deleterious influence of living with many human beings in a small space. In 1559, in the port of Syracuse, in 1560, in the Gulf of Gabes, the Spanish fleet saw itself decimated by disease. In 1570, in the port of Zara, the Venetian fleet, without having drawn a sword, lost nearly forty thousand men, comprising the flower of the Italian militia. The disease broke out among the galleys and spread through the fleet. And before Malta, in 1571, the Turks were not more fortunate in epidemic slaughter.

The ration of a *forçat* in port, in the seventeenth century, was thirty ounces of biscuit, and a soup in which three ounces of beans had for seasoning one-fourth of an ounce of olive oil. At sea this soup was not distributed except every other day, for two reasons: first, because it was difficult to cook when the galley was in motion, and it is important not to over-feed the slave; to become fat is as bad for a rower as for a race-horse. It is necessary, says Captain Pantera, to subject the galley-slave to constant exercise, which consumes the superfluous humors and keeps his body in good condition.

Can any one believe that there exist hours of joy and holidays in the hell which we have described? If Captain Barras de le Penne did not affirm it in the most positive manner, we should doubt it. When they are at anchor in a port, says the page of Louis XIV., it seems as if the whole galley was converted into a hotel. One sees tables set from stem to stern, and men around them who do not lack appetite. The chimney, which is only canvas, smokes from dawn to darkness. To eat and to drink were sometimes the occupations of the crew for the entire day. They try to make up for lost time, for it often happens that at sea there is no fire for three days at a time. The king gives the convicts bread, beans, clothes, and lodging. He permits them, beside, by their work, to obtain what they can make to regale themselves. The crew work with assiduity on working-days, so that they can drink in a day what they have gained in a week. No matter what care is taken, you cannot prevent them from spending more for wine than for food. You seldom see them become rich. In the manufacture of stockings, clothing, brooches, and such things it is difficult to acquire great opulence, especially when they expect by these little industries to supplement what are admitted to be notoriously insufficient rations. That which more than the excesses of the table, always prevents the galley-slave becoming rich, in spite of his industry and careful savings, is the fact that upon his poverty-stricken bench he is the victim of all kinds of exactions. All sorts of methods are invented to rob him. Their suppliers have been convicts, and know just what they want. Their meats, not being delicious, are not high-priced, says Barras; and he adds, "The wine-shops are not without their uses, but it should not be permitted that the officials should have an interest in them." Since the time when Demosthenes carried his complaints to the tribunal, to the day when Suffern commanded in the Indian seas, this tendency of naval officials to lend themselves to commercial enterprises has never ceased to be remarked upon and vigorously objected to. Midias, who it will be remembered, in one of the squadrons of Athens, remained behind to load his ships with wood, with cattle, and other necessities of life, was but the precursor of our *pacotilleurs* (sea-peddlers), against whom our ministry have for two hundred years thundered in vain. The taste for this small trading is scarcely compatible with the noble profession of arms, but the abuse which may result nevertheless need have no serious consequences; but it is far otherwise when, under the name providitor, seneschal, or potentarius, he who is intrusted with the prince's purse makes a profit by the distribution of bad food, false rations, meats provided from sick cattle, or spoiled cheese, when that faithless superintendent, in place of clothing the crew at the proper time and with the regulation garments, renders himself guilty of outrageous frauds in the time of issue, in the measure, and in the quality of the material. It has been also known that what was then the paymaster, would seek, in paying the men their wages, to force upon them bad or reduced money. These, though great wrongs, only affect the poor *forçat* in his comfort; the zeal of his *argousin* (keeper) may inflict the most intolerable torments upon him. On our modern vessels he has taken the name of captain-of-arms. It is necessary, we learn from Captain Pantera, that the *argousin* should be vigorous without doubt, but it is essential that he should be disinterested. His avarice but too often causes the ill-treatment of the slaves. To extort money, he will beat them, double their work, and load them with extra chains, without reason. It is difficult to work with such people it must be admitted, and the task is at all times discouraging. It is this official who must each night examine the chains and see if any have been tampered with, to see that the men are shaved and kept clean.

To preserve the crews from vermin is the first duty in order to avoid an epidemic. When they careen the boat to rub it with brooms the crew are ordered to wash their legs, their arms, and to scrub their bodies. On Sunday they change their clothes. On Monday when in port they wash their linen, which they are made to soak two or three times in the sea. Our sailors of to-day wash their linen twice a week, and they do not always have the luxury of warm water. The dress of the *forçat* has not greatly varied in these centuries, and his baggage has been at all times quite modest. In summer two shirts and trousers of linen, with a cap of red cloth, and a long waistcoat of the same stuff, which comes down to his knees. In winter his trousers are of wool, and he has a woolen overall which comes to his feet. The *buonovoglie* (volunteers) have shoes and stockings; they do not wear them, it is true, but on land; on board the boat, like the others, their feet are bare. They are allowed besides in very cold weather two woolen coverings to each bench. The cold is perhaps the most implacable enemy of a chain gang. The soldiers and the sailors can move about; the galerian is chained to his bench. The enemy's bullets, the storm and the rain, claim fewer victims on board the galley than the excessive cold. The Venetian fleet commanded by Jno. Soranzo had beaten the Genoese in the Black Sea, and carried them to the city of Theodosia in the Crimea, called to-day Kaffa. Soranzo was imprudent enough to winter here. In a few days his vessels were practically without men, so many of the slaves had perished with the cold, and most of those who survived had their hands and feet frozen. The galley-slave, however, does not remain all the time without shelter when he is at anchor in port. Tents spread upon twenty-six spars convert the boat into a floating prison. Each well-equipped galley should have three tents, one called the tent *d'herbiage*, that is to say, made of brown wool, for the winter; two double cotton tents for the summer, one white, one white and blue. When the winter tent is set up they stop it up with oakum carefully at the scuppers, and close the two entrances at the poop and prow with doors made of straw. If the cold in spite of these precautions becomes excessive, they light several furnaces on the inside. It is necessary also to light up at night, which is done by lanterns hung up front and back. They light them at the same time, and they ought to burn until daylight.

It was assuredly a sad experiment which introduced chained oarsmen on board the galleys. So long as they only took volunteers, propriety, discipline, and general usefulness could easily be retained.

In 1420 the general of the Venetian galleys, Pietro Mocenigo, came near formulating a good code. "Order and rule," he says, "are the beginning and end of everything. The absence of discipline is the cause of all evil. Whoever is disobedient the admiral should disembowel. If a member of the ship's company blasphemes God or his mother, saints male or female, he should be whipped from poop to prow. If he belongs to the quarter-deck, he shall be fined a hundred sous." Such a galley would not have shut up within itself, as in the times of the Captains Barras and Pantera, an internal enemy. With a chained gang there must be a constant watch kept, to guard against a revolt. The soldiers and sailors placed on guard have their arms always ready at the slightest sign of an outbreak. They fire without mercy, and put the insurgents to death at once. In the heat of a conflict, says the general of the pope's galleys, "all may be lost by a rising of the slaves. It is indispensable to have established a sort of depot about the mainmast. The repression will be in that way more easy, and the watch better kept. Mere watchfulness will not avail; you must have spies on the benches. Never trust to the slaves; they have but one idea in their head,—that is, to recover their liberty. Examine, then, often their cushions, to satisfy yourself that they have not hidden any arms, files, or other things suitable for getting off their irons."

The philosophy of an epoch where the remembrance of the Borgia was not yet effaced appears to be excusable in taking mistrust as the basis of these precepts. Consider always, said this philosophy, the oppressed as dangerous. The offender writes the injustice he commits on the sand; the victim engraves what he receives on marble. Everything was to be feared from those energetic men, who, by the force of the age, had either to die in their chains or to free themselves by some bold effort. What dangers had power to intimidate them? Their persecutors, nevertheless, did not forget to invite them to resignation, in letting them have a glimpse, as the price of their temporal torments, of the consolatory perspective of another life. With almost the same ferocity as that of the middle ages, the seventeenth century found it quite natural to be without pity for the human body; but there were scruples as to the neglect of the soul. In all expeditions of any importance the admiral never failed to embark on each galley one or more priests, who, after having by their prayers and fastings prepared for the success of the enterprise, could still, at the moment of action, exhort the motley crew to fight bravely for the Catholic faith. Even in time of peace, and for ordinary trips, the staff was incomplete without a chaplain. This guardian of souls filled on the galley a place in harmony with the preoccupations of the times. Let the chaplain, said Captain Pantera, be wary in cases of conscience, and wise to discover the gravity of faults. Spiritual shepherd, let us see that he keeps himself carefully from all that could engender scandal, seeking, on the contrary, to do such things as he would judge of a nature to edify his neighbor.

What is his first duty? To strive earnestly to carry on this enterprise, on which so much depends, to the love and the fear of the Lord. Let him then often exhort the crew to bear patiently the tasks of this life for the love of God and the expiation of their sins. Let him have a diligent care in the performance of divine worship, and let him sing the *Salve Regina* each Saturday; each vigil, the prayer of the very holy Virgin. If there were vessels upon which religious services should have been performed with pomp and care, ought they not to have been those which bore the standard of St. Peter? The galley mass was, however, a privilege only accorded to the galleys of France; they did not have it on any other vessel propelled by oars, not even, as Captain Barras remarks with just pride, on the galleys of the pope. As to the French chaplains, even they lead us to suppose that they were worthy of the great clergy of France, who in all times of history have made a place apart for themselves in the ecclesiastical body by their enlightened zeal, not less than by many virtues. Whom do we find at the head of French charities in September, 1645? A saint, the most sympathetic and most amiable of saints! M. Vincent de Paul, bachelor of theology. "*L'Etat au mai de la marine du Levant*" allotted him in his office of royal almoner, and on account of his superiority over all other almoners of the galleys, the sum of six hundred livres. Observe then, a chaplain who, according to Captain Pantera, could inspire by his example in sinners a horror of sin, and perhaps, who knows, forced something of his sweet gentleness to penetrate into the brutal soul of the persecuting overseer.

We have had also in sailing-vessels of our own time brutal discipline and corporal punishment, but it would never do to establish on such a basis any comparison between the sailing-ship and the galley.

These are two distinct worlds separated by an abyss. When we tell the stories of the great victory gained by the navy of oars, we ought to have in our mind's eye that deck manned by those unhappy wretches who, in the midst of the ordinary horrors of battle, fought in their chains, and had not even the consolation of rejoicing in their victory, for no victory brought any change in their fearful lot. Defeat for them was more useful; it often rendered liberty to the convicts of the defeated galley, and more than once it was partly their work. At Lepanto the Christian slaves seeing the right wing of the Turkish fleet put to flight by the allied galleys, became so wild that they broke their chains and handcuffs. They then attacked the Turks from the rear with incredible fury, and contributed in a certain measure to the triumph of the Holy League.

In the fifteenth and eighteenth centuries the dramas of the sea have as the ancient dramas, actors specially charged to fill the great *rôles*, and a chorus which does not take a direct part in the action; the imprecations of that chorus spoil for us the navy of the good old time to some extent.

TORPEDOES ON SHIPBOARD AND IN BOATS.

(Arranged and translated from an article entitled "Les Torpilles abord des Navires et des Embarcations de Combat," by C. CHABAUD-ARNAULT, Capitaine de Frégate, M.F. (*Revue Maritime et Coloniale*, Août, 1884), by WM. BAINBRIDGE-HOFF, Commander U.S.N.)

I.

IN the last few years a great many improvements have been made in the discharging apparatus of auto-mobile torpedoes, as well as in the torpedoes themselves. These last have been improved as regards speed, stability, and in the solidity and size of the explosive charge. Besides this, we are getting to understand them thoroughly, and to handle them better. Their regulating is no longer a secret, confined to a few experts. *Any one* has a chance to study their mechanism, sooner or later, freely.

Circumstances, too, have conspired to make friends for this torpedo. In the opinion of many there is *no other* torpedo; but although the divergent torpedo may be thought very uncertain, still the spar torpedo has its *raison d'être*, if it be only to *emphasize* a ramming attack.

The auto-mobile torpedo is a terrible weapon, probably the most terrible of all the weapons of the day that war-ships have at their disposal; but it cannot be used under all circumstances, as can the gun, and therefore, will never supplant it. Notwithstanding all the brilliant results of experiments lately obtained with the torpedo, much still remains to be done to render the installation of the discharging tubes truly practical. We believe, though, that the *spar torpedo* is also of great utility, and that it will be so for a long time yet, if not always. Now it is an indispensable arm for a torpedo-boat, and under certain circumstances is of much greater efficacy than the auto-mobile torpedo.

To-day France is dealing with the results to be obtained by discharging the torpedo from the broadside of a vessel going at full speed. Without denying that this knowledge is of great moment, we still ask ourselves the question whether information as to the behavior of a torpedo discharged from the bow or quarter is not of equal moment. These questions furnish the principal points for us to deal with.

II.

First let us see what is admitted in our navy for the torpedo.

1. That the auto-mobile torpedo can only be looked upon as offensive from 50 metres; that it only becomes dangerous at 35 metres; and that, outside of 400 or 450 metres, there is hardly any chance of its doing damage.

2. That in practice the auto-mobile torpedo can only be discharged in a satisfactory manner from a ship or boat going ahead by using *movable* tubes *above* water, or by using *fixed* tubes like those fitted in the torpedo-boat.

3. That the divergent torpedo can only be employed as a defensive arm, intended to protect the flanks of the towing vessel.

4. That this torpedo is useless when carried by boats or by torpedo-vessels.

These four points being admitted, we can enter into the discussion of the subject under consideration.

Captain Colomb, who is an authority on such matters, says that at sea at a distance of 900 metres, only 10 per cent. of the projectiles of great guns take effect. Still more must this small proportion be decreased of effective hits where the projectiles strike the target at an angle of 30° or less. Actual experiment has not developed what is the smallest angle that an auto-mobile torpedo can strike a ship's side and explode, but it may probably be set down that it is not likely to take place where the angle is less than 30°. Theoretically it seems true that the chances of striking a certain point vary in the inverse proportion of the squares of the distances. If this is the case at 450 metres, 40 per cent. of great-gun projectiles should be effective, and at 225 metres every shot should tell. In practice, however, it is not realized. At a range varying from 50 metres to 450 metres no greater proportion than 25 per cent. can be counted upon to have effect; consequently, if the trajectory of the auto-mobile torpedo has the same accuracy, we can only look to the same percentage of hits for this weapon (that is, 25 per cent.) for the same distances.

Let us now compare the flight of the shot with that of the auto-mobile torpedo. As regards errors likely to arise from elevation, the advantage belongs to the torpedo, since after 50 metres in its course is attained, its immersion depends on the torpedo itself, and not on the way it was put into the water, whereas with guns, we know that the effect of elevation influences the shot during its whole flight.

When we come, however, to consider lateral pointing, the auto-mobile torpedo is evidently submitted to causes of inaccuracy infinitely greater than is the shot. We notice first, that the error arising from firing at a moving ship with this weapon is from experiment set down as from thirty to forty times greater than it is with a gun. Although this ratio seems very disheartening, still we can remember that the error in lateral train at a distance of 200 metres, the torpedo moving at a speed of 24 knots and the enemy's ship at a speed of 12 knots, will hardly ever exceed 11 metres, if we suppose the torpedo to run straight as it is sent.

Experience seems to show that, contrary to what might be expected, the movement of the vessel discharging the torpedo has little or no effect upon its flight; or at least comparing the error arising from a misjudgment of our own speed, which must be very small, with the error we may make in judging both the speed and course of the enemy, which may be easily very great, we can afford to throw this element of inaccuracy out of the question.

The auto-mobile torpedo is a capricious machine, subjected to irregularities hard to explain. The meeting during its flight with any floating object, even the smallest, such as a billet of wood, a piece of seaweed, will throw it out of its course. The shot, on the other hand, is not so influenced. The side action of the wind on a shot during its trajectory can be foreseen and compensated for, but there can be no such correction made for the action of the waves on the flight of a torpedo.

In regard to the errors arising from rolling, pitching, and sheering of the ship, both gun and torpedo are theoretically affected equally by them, but practically their worst effects are shown on the torpedo.

To recapitulate, if the flight of the auto-mobile torpedo against a moving ship has over the gun the precious advantage of not being controlled in regard to elevation by the firer, it has, to more than balance this, the disadvantage of being much more governed in its horizontal pointing by errors arising from a want of proper judging of the speed and course of the enemy. Again, we must put down to its detriment the imperfections arising from its delicate organism and the numerous chances of its being thrown out laterally in its course by meeting a floating body.

We will say, then, that if we can count on 25 per cent. of the shot of a gun striking at 450 metres, the accuracy of the auto-mobile torpedo can be considered generously endowed if we accord it 20 per cent. of hits at this distance.

Since Captain Colomb and most writers believe that artillery fire in action will be at a range at level, the same conclusion is imposed upon us *à fortiori*, for torpedoes; this range may be considered from experiment to be between 50 metres and 150 metres.

Since no ship can be supplied with auto-mobile torpedoes to the extent in number of the projectiles furnished for the guns, these torpedoes should only be used when the chances are most in their favor of being effective; that is, within the limits mentioned in the previous paragraph.

Even under these circumstances the auto-mobile torpedo cannot be successfully used against a ship which presents her bow with the intention, for instance, of ramming. It is true then, in this case, errors depending upon a false appreciation of the speed of the attacking ship entirely disappear, but on the other hand, this ship presents a poor target, since the torpedo will strike a glancing blow on her bow, perhaps with insufficient force to cause an explosion.

In such cases the divergent torpedo, protecting the quarters of a ship menaced by a ram or by an auto-mobile torpedo from a vessel in chase, fulfills better a *defensive rôle* than would the auto-mobile torpedo. It will not hinder, it is true, the ship towing it from being rammed or hit with the auto-mobile torpedo by the adversary if he continues on; still it will be a satisfaction to feel that the adversary which sinks you, may himself be sunk by the divergent torpedo. It belongs to what may be termed the "weak" class of torpedoes, and perhaps for this reason an adversary should always run the risk, and stand on where he can use his auto-mobile torpedo and his ram, if he is only opposed by a divergent torpedo.

The use of the auto-mobile torpedo calls up another kind of reflection, awakens another line of thought, which merits our serious attention. In nearly all our fighting ships the apparatus intended to project the weapons is always situated in an unprotected part of the hull, and is exposed to the consequences of great-gun and small-arm fire. What would likely be the result of an enemy's projectile striking a charge of 30 to 35 kilos. of gun-cotton primed with fulminate of mercury? An accident in England gave us some idea of the destructive effects of the bursting of a reservoir of air compressed to 70 atmospheres. A double explosion of the gun-cotton and the compressed air incident to being hit by a shot will certainly be disastrous. Any one who has seen the havoc done on a covered deck by the bursting of a small shell, can easily imagine the disaster attendant upon the explosion of 20 kilos. of gun-cotton. The chances are that the vessel would be rendered *hors du combat*.

A long series of experiments seems to determine that the auto-mobile torpedo must not be discharged at a greater height above the surface of the water than 1 metre or 1.20 metre. It must not be forgotten that the inventor intended that these torpedoes were always to be discharged from a tube *under* water, and therefore, although well made, they are not so stoutly built as to stand *everything* in the way of a fall. With the discharge port above water, as now fitted, a vessel which is rolling heavily incurs two risks as regards the use of this torpedo. Either when her port is at its highest point out of water, her torpedo, on being launched, will fall too far and be injured, and therefore of no use; or, if the ship waits until she gets on an even keel, she will in all probability miss the instant when she should discharge her torpedo to strike the enemy.

It will be seen, then, that the auto-mobile torpedo does not offer every guarantee as regards efficacy, security, and facility of handling, which we have the right to expect in a weapon that pretends to be the only one of its kind. Since this is the case, we will do well to hold on to the divergent torpedo, which, although uncertain, still offers but little or no danger to the vessel towing it.

Finally, we may remark, in a heavy sea both divergent and automobile torpedoes become useless, the former from the fact that they cannot be made to act well among large waves, the latter because the discharging tubes are forced to be near the water-line, and therefore are in about the same category as regards efficiency as were the lower-deck guns in the old-fashioned line-of-battle ships.

III.

In our navy we are considering the following theoretical principles as offering a fair chance of being borne out in practice in regard to combats between single ships:

1. Two vessels wishing to engage in a ramming contest will approach one another very close aboard, if, indeed, they will not collide end for end and broadside to broadside. Circling will immediately ensue at this stage, in which each vessel will turn towards its adversary.

2. In such an encounter, each vessel will endeavor to keep his bow on his antagonist.

3. In a single combat between two ships, it will suffice that *one* of them tries to ram the other, in order that the other shall be forced to do the same.

4. Two ships, wishing to engage with artillery only, to the exclu-

sion of ramming, will either run for each other, pass, and round to at close quarters, or they will present their broadsides to each other at fair range. In the first case each of the vessels will turn towards his adversary with his helm hard over, and, when they are broadside to each other, the helms will be righted, and they will continue on parallel or slightly converging courses. In the second case the two ships will each turn with the helm the same way, and a circling fight will ensue.

5. Finally, we can add that in case two adversaries meet each other with the auto-mobile torpedo installed in broadside, and they wish to use this weapon to the exclusion of ramming, these two vessels will manœuvre, without doubt, to pass at a distance from one another of 100 metres up to 150 metres, a range most favorable for this arm. If at this time no result was obtained, each ship would turn towards his adversary, and each would so steer that they would head in the same direction, separated 100 metres to 150 metres. In this situation the discharge of the auto-mobile torpedo would soon cease, for these two reasons:

1. One of the vessels would be either disabled or sunk.
2. The supply of auto-mobile torpedoes would run out.

It is but right for us to say, however, that such a contest as we have portrayed is, to say the least, most unlikely to happen.

There are three problems for us to attempt to solve. They are the following:

1. The employment of the auto-mobile torpedo on board vessels; will it change or modify tactics for these last?
2. Which is the most advantageous position to give to the ejecting tube on board these ships?
3. Under what circumstances can divergent torpedoes be most advantageously used?

Let us first consider a hostile meeting between two rams, in which all the manœuvres are directed to use this weapon in the most advantageous manner. Generally this class of vessels are comparatively short, have double screws and large rudders, and are therefore possessed of small turning-circles. After having run for one another, the two rams pass very close or touching, so that the auto-mobile torpedoes will be utilized. Suppose (see Fig. 1) that *A*, with the auto-mobile torpedo installed in broadside, keeps off with port helm so as to bring it to bear, and passes at most 50 metres on the port side of *B*. *B* can *always* spoil *A*'s plan by turning to port and menace *A* with his (*B*'s) ram, and also with his auto-mobile torpedo if it is installed in the bow.

The first time of passing, of which we have just spoken, having taken place, each ram will put his helm hard over, turn towards his adversary, and a circular combat will commence (see Fig. 2). When each shall have performed one-quarter of a turn they will find themselves respectively at *A′* and *B′*, broadside to broadside, at from 250 metres to 350 metres apart. Let us say 300 metres. At this distance, the ram *A*, which we have supposed has a broadside installation, can discharge a torpedo at *B*. Knowing as much as we do about the weapons, we doubt if there is much chance of the torpedo striking *B*.

During the progress of the fight it will certainly happen that the two rams will cross one another's paths at distances favorable for using the auto-mobile torpedo. This eventuality, however, should rarely happen if we lay down the rule that each of the combatants is to constantly keep his bow towards his antagonist. We should remember that their great turning power permits them to attain this end very rapidly.

Fig. 1.

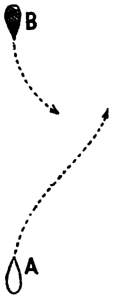


Fig. 2.

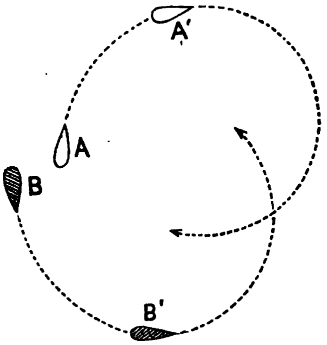
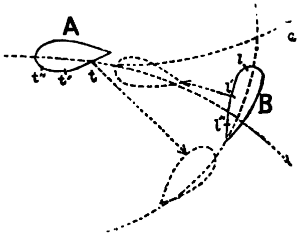


Fig. 8.



Suppose, now, that each of these rams were fitted not only with launching tubes in broadside, but that they had installations for torpedoes on the bow and both quarters; all these at an angle of 45° with the keel-line. The ram *A* strives to ram *B* (see Fig. 3), but having arrived at a certain point, say within 150 metres of her, *A* sees that his course takes him astern of *B*. Her ramming attack fails. From an inspection of Fig. 3, we see that a torpedo discharged from the tube *t′* on the starboard bow can strike normally or nearly so on the hull of *B*, whilst a torpedo discharged from the tube *l′*, from the starboard broadside of *B*, if it strikes it will be at a glancing angle and will probably not explode. On the other hand, when the two rams have arrived in the position shown in Fig. 4, and, if they pass at a distance of 50 metres from each other, it may be seen that a torpedo discharged from the tube *l″* on the starboard quarter of *B*, could strike *A* normally, while the torpedo discharged from the tube *t′* in *A*'s broadside has only a small chance of striking *B* at a fair angle, especially if *B* has put his helm over the other way, as will be most probable, in order to bring his bow to bear on his opponent.

Suppose, now, the encounter presents the phase shown in Fig. 5. *A* steers to ram *B*, but finds that he will have to pass under *B*'s stern.

Fig. 4.

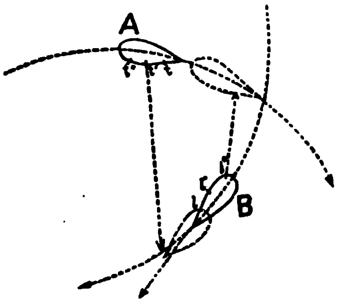
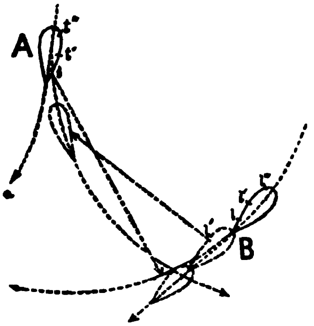


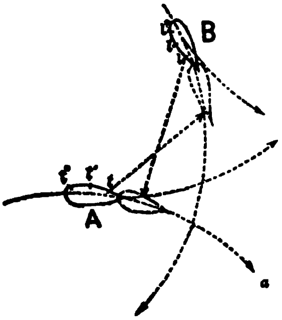
Fig. 5.



It will be seen that a torpedo discharged by *A* from her port bow tube *t* (slightly helping her aim with her helm if necessary), will probably strike *B* fairly, although the torpedo has been discharged from a long distance off. *B* can discharge a torpedo against *A* from his broadside tube *l′*, but the torpedo will strike *A* at an acute angle. If *A* continues his circle and passes astern of *B*, this latter can use his starboard quarter torpedo effectively.

To consider another case (Fig. 6), *A* manœuvres to ram *B*, but finds himself so advanced that he will pass ahead of *B*. He is obliged to continue his circle ahead of *B*, lest *B* should ram him, and so describes the arc *Aa*. In this situation the figure shows that *A* can utilize advantageously the tube *t* on the port bow, and *B* can use the tube *l* on his starboard bow, whilst the broadside tubes remain useless.

Fig. 6.



It will be found to be the case that bow and quarter tubes are much oftener used than broadside ones.

It is certain that in a ramming contest the attention of the commanding officer will be concentrated on two points solely: to escape the bow of his adversary and to seize a favorable occasion to sink him with his ram. This being the case, it is questioned if any officer can supplement the amount of nervous force necessary to serve these ends by a quantity, which will also permit him to think upon and decide on manœuvres necessary to the intelligent employment of his broadside installed torpedoes.

In considering a contest between rams, we must remember that each of them will manœuvre on a tactical diameter of about 300 metres, from which it follows that they will rarely find themselves so far apart that any movement of the helm, which is not intended to ram or to escape being rammed, will be fraught with danger. From which we conclude that in such a combat, any use of the helm looking to the presentation of the broadside of either vessel to its opponent in order to discharge a torpedo from that installation will be generally useless and always risky.

It may seem logical that rams should protect their quarters by divergent torpedoes, since they are not well armed with artillery; but the efficiency of this class of torpedoes is not great with vessels having small turning-circles, as there is great danger to be apprehended from the tow-lines fouling the rudder or screws; therefore these vessels must seek safety in action by the intelligent use of their admirable turning qualities.

Let us now consider the case of an encounter between line-of-battle armor-clads, each furnished with a solid ram, but still to be considered as armed *par excellence* with artillery. These vessels will have entirely different sea qualities from those possessed by rams, and generally less commendable turning qualities. Instead of having a tactical diameter of 300 metres, theirs will average 500 metres.

This stated, it is evident that in an encounter between two vessels of this class, as it is in a combat between two rams, the maxim would hold good that if one vessel attempts to ram, the other will be compelled to engage with her in this kind of contest, unless she has far greater speed. It is probably true, too, that if during the fight one vessel finds that she is inferior in strength and accuracy of fire, she will strive to use her ram and torpedo defense to offset the disadvantage she labors under as regards artillery.

These two armor-clads will, in all probability, run for one another and pass close aboard, the same as in the case of two rams, therefore torpedo-tubes on the bows and quarters will be important.

The engagement will oftenest commence in the manner just stated; each vessel may turn so that they will stand on broadside to broadside (see Fig. 7). On account of their being separated 500 metres, they will be out of effective range for the auto-mobile torpedo, and therefore it cannot be used. The question now arises, will they converge their courses so as to use this weapon? To do so, it is necessary that each ship must have great confidence in its artillery and torpedoes, and very little in its ram. We believe that such a state of things will rarely occur, and that it is infinitely more probable that one of the two combatants will attempt to ram, and that the other ship will be obliged to meet this weapon with her own.

It is possible, nevertheless, that the two armor-clads, before passing one another, would each wish to find out the power of the artillery possessed by its adversary. In this case each of the ships would present his broadside to the other at good range before ramming was possible, and an artillery duel would commence (see Fig. 8). These two vessels would be obliged to move around a circle at least 500 metres in diameter, and therefore an auto-mobile torpedo would be useless.

Fig. 7.

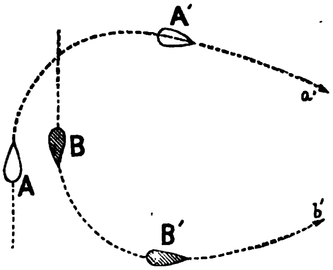
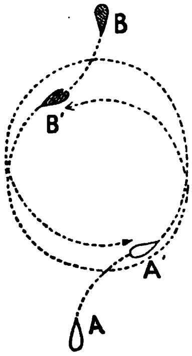


Fig. 8.



It may be said for both rams and armor-clads, in a single combat, that the broadside installation is of less use than either a bow or quarter installation. In a fleet fight, however, it is entirely different, as we will see later on.

With large ships the use of divergent torpedoes is practicable, from the fact of these vessels having large turning-circles. In single combats there is no friendly ship with the movements of which they will interfere, and therefore this arm can be employed. If an armor-clad was engaged in a duel with a ram, these torpedoes might have a moral effect in preventing the ram, with the great advantage which it has as regards turning power, from assaulting the armor-clad with its bow. Should this be the case, the ram would stand a good chance of being sunk by artillery, as it is to be supposed that the armor-clad is much more powerful in this respect.

Suppose that the two ships *A* and *B* are large cruisers intended for foreign service. Even if these vessels are provided with rams their principal weapon is the gun. In order to give them a powerful outfit in this respect, good speed and large stowage capacity, certain qualities demanded by other classes of vessels are sacrificed; for instance, turning power, weaker hulls, and therefore inferior ramming qualities. A combat between two such vessels would probably resemble that shown in Fig. 8. Since their turning-circles are large, in a duel auto-mobile torpedoes would not be likely to be used, although divergent torpedoes might be. But since these vessels may have to fight in numbers against a more or less numerous enemy, they must be generously endowed with discharging-tubes for auto-mobile torpedoes, and a large quantity of these weapons must be supplied.

As the vessels grow smaller, the diameters of their turning-circles become less. The utility of divergent torpedoes for this reason disappears, and when the auto-mobile torpedo can reach across the evolutionary diameter the need for a broadside installation becomes apparent.

In regard to the installation of the auto-mobile torpedo forward and aft, in the direction of the fore-and-aft line of the ship, it can be said that a stern installation is very bad, on account of the screw race; whereas a bow installation in the axis of the keel is excellent for vessels with straight stems, as is also an installation in this build of vessels on each side of the stem, in the same manner as torpedo-boats are fitted. When the vessel has a long projecting spur or ram, a bow installation is bad, as the torpedoes are liable to strike upon it, and either explode or injure themselves.

Vessels which have these projecting rams are generally large. Therefore the best place to install the torpedo discharging-tubes will be on the bluff of the bow, set at an angle of 45°. Of course the ram should not be sacrificed to these torpedo installations, as it is *par excellence* the weapon of the ship.

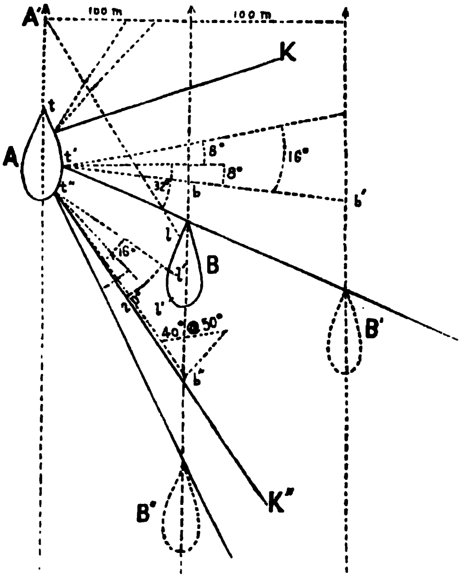
It is not the same, however, for smaller cruisers and corvettes. If we suppose a vessel of this size chased by a large one, she will be under every disadvantage as regards speed, armament, scantling, and number of crew. One advantage only will she have,—greater facility of turning. She is too fine forward to permit a tube to be put on each bow at an angle of 45°, therefore we think the proper installation would be a tube on each side of the stem, the same as a torpedo-boat. As her small turning-circle would give her a better chance to keep her bow on the enemy, it would be better for her to use her auto-mobile torpedoes discharged from these tubes, which she could do with great ease, than it would do to attempt to ram her adversary, a move which in all probability would be ineffective, and, perhaps, very disastrous to this small vessel.

IV.

We will now look into the part played by the auto-mobile torpedo in both chase and retreat. Let *A* be the chased vessel and *B* the vessel chasing (see Fig. 9).

Suppose each vessel to be 80 metres long, and to be armed on each side with a torpedo-tube amidships at right angles to the keel, a tube on the bow, and another on the quarter; each of these set at an angle of 45° with the keel. We will suppose that each torpedo-tube can be trained from 8° forward of its normal installation to 8° abaft its normal installation, through 16°. We also assume the following: that *B* having nearly caught up with *A* has slowed slightly, so that each vessel's speed is the same, and equal to one-half the speed of the torpedo; that the ships are steering parallel courses, which are separated 100 metres.

FIG. 9.



A torpedo discharged from the broadside installation (*t'*) of *A*, trained as far aft as possible, will cover the 100 metres while *B* advances only 50 metres, or it will strike *B*'s stem at *b*. If the parallel course of the two ships were separated 200 metres, it will be seen that the torpedo discharged under the same conditions will reach *B'* when he is at *b'*. Therefore it follows that *B*, as soon as he finds himself within the horizontal angle where a torpedo fired from *A*'s broadside could reach him, should drop astern of this position, or by calculation should keep more than 32° abaft *A*'s beam.

On the other hand, a torpedo discharged from the quarter installation (*t''*) by *A* against *B* would strike the latter at *b''*. This angle would be so small, if the torpedo struck the stem, that it would not be certain to explode, and therefore would probably be thrown away; but if it struck on the bluff of the bow it would be effective. Therefore *B* would run a great risk if he drew up on *A* anything forward of the line *t″ B″*. This quarter installation of *A* then would have the good effect of keeping *B* more astern, which would be greatly to *A*'s advantage from an artillery stand-point, and furthermore would prevent *B* from using his bow installation, which he otherwise could do.

If there was no broadside tube installed in *A*, it is true that *B* could be safe from torpedoes if he could place himself between the extreme forward aim of the quarter installation and the extreme aftermost train of the bow tube. But this risk would hardly be taken, as *A* could, by a sheer, having once gotten *B* into this position, use either torpedo on him.

Let us say further, suppose *A* has only a broadside tube. It would be very hard and very dangerous for him to sheer so as to bring *B* in range, if *B* is abaft the line *t′ B′*, for *B* could ram *A*, being then within *A*'s circle, and having him on a *danger-point;* or if *B* had no ram he could also sheer and give *A* his bow torpedo.

It will therefore be seen that in a vessel which is being chased, a quarter installation of the torpedo is a necessity, and it may be stated as a conclusion, that in a chase or retreat, bow tubes and quarter tubes are of more use than are those placed in broadside.

Furthermore, the moral effect of these quarter tubes used in connection with divergent torpedoes will be such as to prevent the vessel in chase from taking the very best position for the use of his artillery, and will also tend to prevent him from attempting to ram.

V.

Lieutenant Besson shows in his paper that the opinions in our service at present as to how squadron-fights in future will be conducted, can be formulated in this wise:

1. Two squadrons or two fleets will meet each other formed in front (line abreast).

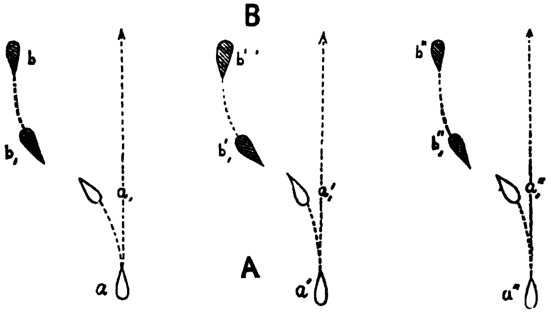
2. After the first charge the combat will rapidly degenerate into a *mêlée*.

3. In a fleet fight the tactical unit is the single ship.

Since we consider the ship to be the tactical unit, the discussion as to how torpedoes are to be employed in a fleet fight will be short, as their use under these circumstances will be governed by the same or nearly the same rules which apply to single ships. We would call attention to one great difference between duels and fleet combats. The commanding officer of each ship in the first case can concentrate his attention on a single adversary; in the second case he is obliged to watch not only the different enemies who can attack him simultaneously, but again, all the vessels of his own side, in order to act with them, to give and receive proper support.

It must be understood that we are considering a fight between two squadrons opposed in front (line abreast) (Fig. 10). We will suppose

FIG. 10.



each ship to be separated from his neighbor two cables; that squadron *A* is armed with auto-mobile torpedoes and that the *B* squadron is not. Now if each vessel charges in the interval normal to their lines, it will be easily seen that the advantage lies with *A* squadron, since it can use its auto-mobile torpedoes at the excellent and effective range of one cable; but suppose each ship of *B* squadron turns towards their opponents in line *A*, then each of the *A* ships must turn towards their antagonists or be rammed. If they do this they cannot use their auto-mobile torpedoes, so it may be said that *B* can annul *A*'s advantage by turning towards his ships. True, the ships in *A* could fire their torpedoes at ships in the line *B* other than their immediate opponents, as for instance *a* could use his torpedo on b_1', but it would be from a distance of two cables or 360 metres, and therefore the chances are few of its being effective.

So we see that there is little chance of opposing fleets using their auto-mobile torpedoes in the first charge if they are formed in front (line abreast). Now will it be proper to change the formation for attack, so as to give this arm a pre-eminence above the ram? We think not, for the reason that the front formation may be termed the natural fighting order, since each ship can force his adversary to face him, and at the same time each ship gives and receives the greatest support from his neighbor.

We think that Mr. Besson is wrong in supposing that divergent torpedoes will be used during the first charge and not afterwards. We are of the same opinion with Captain Rivet, that they will *not* be used during the first charge, and that they will in the succeeding *mêlée*. Looking at Fig. 10, we observe, for example, supposing that *A* squadron is furnished with divergent torpedoes and that *B* squadron is not, that *a*, if he is obliged to encounter *b*, will see his (*a*'s) tow-line cut away by *b* when *b* turns to ram him, as he will undoubtedly try to do. If each vessel charged normally through the line of the other fleet we could see that Mr. Besson's position was tenable, but as this is not likely to be the case, and either one line or the other will attempt to ram, we agree with Captain Rivet when he says, "The employment of divergent torpedoes presents more drawbacks than advantages in the first part of a fight; on the other hand, later, when the formation is broken up, ships may find them very useful."

During a *mêlée*, what *rôle* will auto-mobile torpedoes play? Each captain cannot calculate in advance what he will do, as in a duel between ships. Every moment will bring forth something unexpected. Hence the reason for our asking the question which begins this paragraph. All we can say is that circumstances will alone decide its employment. Everything is given up to the unforeseen. One vessel starts to ram another; suddenly she is obliged to modify her tactics, to escape a ram from a second adversary; some other vessel, going to the succor of a consort, comes on top of an enemy, till that instant unseen on account of the smoke which obscures the field of battle. If this is true of ramming, where the missile, so to speak, can be stopped in its flight and its course changed, how much greater would be the responsibility of using a weapon which, after it is discharged, can in no wise be governed? Still again, the torpedo may be the most desirable arm to use, through a combination of circumstances; and, therefore, since this condition might occur, we have no right to handicap ourselves by not having tubes fitted in all line-of-battle ships in the three installations we have before considered.

VI.

Spar-torpedoes, used from gun-vessels or swift launches, are serviceable to attack an anchored vessel without elaborate external defense, such as booms, nets, etc., where there are swift currents, on a dark night, and when there is no sea.

Auto-mobile torpedoes, used from gun-vessels or torpedo-boats, are serviceable where there are feeble currents, and when there is no sea, against ships anchored or otherwise, even if they are defended by booms, nets, etc. To use the auto-mobile torpedo acceptably, a night relatively clear is the best.

The principal objection urged against spar torpedo-boats is that the boat must proceed until contact is made with the ship. To do this, the boat is kept under machine-gun fire at short range long enough to destroy her and her crew; whereas the auto-mobile torpedo-boat can discharge her torpedoes at a distance, and slip out of range. The objection seems entirely tenable at first glance; but let us examine into the merits of the case, and see if it is as great as it appears.

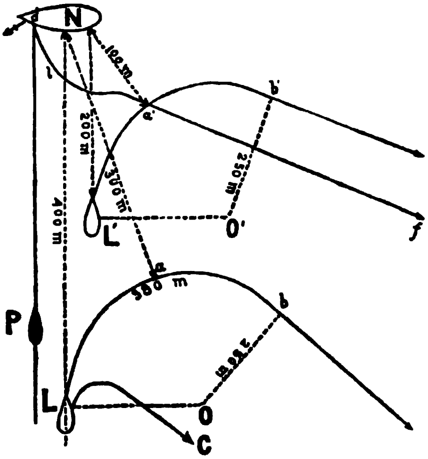
Now, at what distance would an auto-mobile torpedo-boat stop abreast an anchored vessel to discharge her torpedoes? In our opinion not more than 200 metres from her,—more likely 150 metres, especially if there was any current or any sea on.

Nevertheless, let us admit that the chances are so favorable that the auto-mobile torpedo is discharged from a position 400 metres from the enemy. Arrived here, the commanding officer of the torpedo-boat will do one of two things,—he will either stop, discharge his torpedo, turn round quickly, and run away as fast as possible, or he will discharge his torpedo at the enemy, his boat going at full speed, and immediately put over his helm, describing a curve of greater or less diameter, according to his manœuvring qualities, and run off as in the first case. Let us give this torpedo-boat 18 knots speed, and allow it a tactical diameter of 300 metres. Circumstances will govern which of the methods mentioned above the torpedo-boat will use. If, for example, if the water is lumpy, and the breeze fresh and blowing on the port bow, the torpedo-boat will probably find it in his interest to stop, then work his head round to starboard through the necessary number of points. The slowing of the speed will in effect aid the pointing of the discharge-tube, and the force of the wind will help the boat to turn rapidly. If the sea was smooth, and no air was stirring, the torpedo-boat would probably discharge its torpedoes moving ahead at full speed, then haul off by describing the curve *L, a, b* (see Fig. 11). This manœuvre will make the boat pass, it is true, within 300 metres of the enemy (*N*), at *a;* but, as we will soon see, this approach hardly increases the danger run by the torpedo-boat, which, indeed, might be greater than if it remained stopped at 400 metres from the enemy. The time required by either of these two manœuvres will, in all probability, be about the same. In the first case she arrives at *C*, having worked herself around as short as possible. In the second case she arrives at *b*, having traversed the arc *L, a, b*.

Suppose, then, that the auto-mobile torpedo-boat should use the second method; that fire has been opened on him at 1200 metres distance with machine-guns, which continues during the time he advances, fires his torpedo, and retreats, until he has gotten away to a distance of 1200 metres again.

From the point where fire was opened until the boat attains the point *L* it has covered a distance of 800 metres. To put himself at a safety point again, the commanding officer will have to take his boat 800 metres from the point *b*. Sixteen hundred metres (1600^m) with 18 knots' speed, requires 2^m 52^s to make; the arc *L*, *a*, *b*, which is 380 metres, will take 61^s to pass over, supposing that the curve is performed with a reduced speed of 12 knots, owing to the action of the rudder. The total time, then, that the torpedo-boat will be under fire will be 3^m 53^s.

FIG. 11.



Let us now consider a boat armed with spar-torpedoes (Fig. 11) under the same conditions. After having exploded his torpedo under the bow of *N*, at *d*, the commander will back out, turn to starboard, for example, and run away in the direction *f*. If we allow him twice the time to disengage himself from the enemy that we do the auto-mobile torpedo-boat to turn through the arc *L*, *a*, *b*, that is, 2^m 2^s, and consider that fire is opened upon him when he is 1200 metres off, we will have the length of time that the boat is exposed to this fusillade equal to 5^m 26^s, or one-quarter or one-third longer than the time the auto-mobile torpedo-boat will be under fire.

Instead of the auto-mobile torpedo-boat being able to discharge its torpedo from a distance of 400 metres, we are convinced that in the majority of cases this distance will be only 200 metres at *L'*. It will be easy to deduce the time this boat will be under fire under the circumstances, and we will see that it is less than the exposure of the spar torpedo-boat by only one-sixth or one-seventh of the time.

Without doubt the following objection will be made to our course of reasoning: that the danger from fire that a torpedo-boat encounters does not arise so much from the *length* of time that she is exposed as it does from the *shortness* of the range, especially at the instant she is performing the most delicate and necessary portion of her work. Without undervaluing the justness of this remark, we would say, *first*, that when the auto-mobile torpedo-boat has either to stop to fire her torpedo, or to pass within 100 metres of the enemy, as she would be obliged to do when describing the curve L', a', b', her exposure would be nearly the same as for the spar torpedo-boat; and, *secondly*, if the experiments made in Holland in 1879 are to be depended upon, the difference between the danger run by the auto-mobile torpedo-boat, even stopping 400 metres from the enemy, and that run by the spar torpedo-boat, continuing its course up to the enemy, is not as great as one believes.

All through this discussion we have considered the torpedo-boat to have met with a check, and that the attack has miscarried. But if the demonstration has met with a successful termination, and the defense on the part of the enemy ceases when the explosion takes place, then the difference between the time during which the spar torpedo-boat and that during which the auto-mobile torpedo-boat is exposed is still less. For if we give the auto-mobile torpedo 25 knots speed, and the torpedo-boat 18 knots speed, the time is only 14^s for 400 metres, and 7^s for 200 metres.

Although we have spoken in seeming favor of spar torpedo-boats, it must not be concluded that we suppose they are more to be desired than are those torpedo-boats fitted to discharge auto-mobile torpedoes; but we do say that a mass of explosive material carried to the point where it is to be applied by an intelligent person, is more likely to succeed in its work than if a complex and not always reliable machine furnished part of the continuity.

VII.

Another train of thought must now be followed in connection with torpedoes and defenses devised by vessels to protect themselves. There is no doubt but that metallic nets can be made strong enough and can be so rigged as to keep out an auto-mobile torpedo, also that booms can be made heavy enough to prevent a torpedo on a spar coming in contact with the ship herself by being breasted in by a torpedo-boat. To attack a vessel defended in this way, we must use a vessel large enough for her mass to overcome the resistance of the booms, and her torpedoes sufficient in number, if auto-mobile, to first blast a hole in the submarine obstruction, and then to enter through the aperture and blow up the enemy. As this vessel during this time will be under fire, which she can in a measure return, it would be necessary to fit her with spar-torpedoes, which in this case would probably excel in usefulness any other.

For this purpose, the gun-vessel or the gun-boat with the auto-mobile torpedo installed, is essentially suited. She can increase her value by towing with short scope two spar torpedo-boats, one on each quarter, which, as soon as she breaks through the obstructions, will enter and assist their principal in destroying the enemy. Should the attack fail by the gun-boat being sunk, her small crew would have the torpedo-boats now probably alongside, ready to help them out of an ugly scrape.

We have only looked into the case of a single ship at anchor defended by her nets and her artillery. It will be difficult to look into all the phases that an anchored squadron of ships might present when attacked by a flotilla of torpedo-vessels. We only intend showing by two or three examples that the exclusive use of the auto-mobile torpedoes for attack would, to say the least, be imprudent.

FIG. 12.

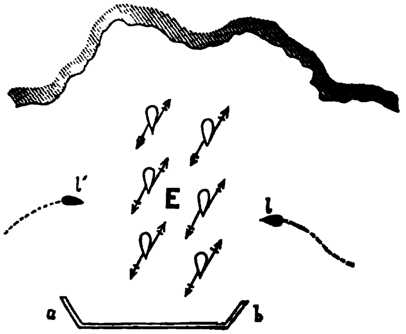
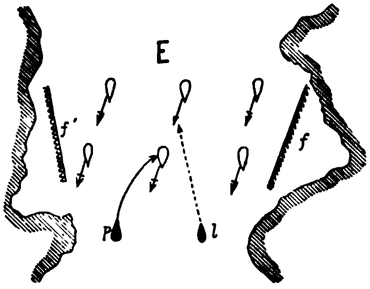


FIG. 13.



Suppose a squadron (*E*) of six vessels moored close together in double file (in lines ahead). Their front is protected by a boom, *a*, *b*, but their flanks are completely undefended (see Fig. 12). It is evident that the attacking flotilla should be armed with auto-mobile torpedoes, as they could easily advance to within 200 metres on one flank or on the other, at *l* or at *l'*. Furthermore, should the squadron be anchored as represented, the auto-mobile torpedo, if it missed one ship, would in all probability be likely to pick up another.

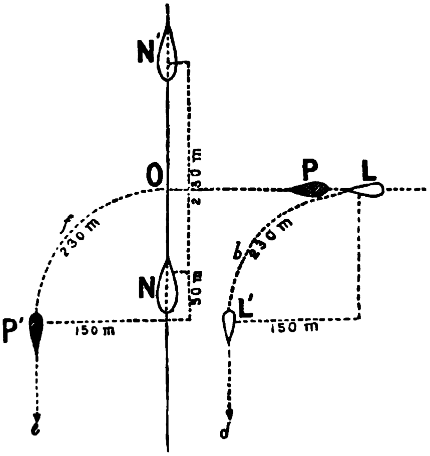
If, now, we take into account a squadron anchored in double front (two lines abreast), as in Fig. 13, it will be seen that the front is uncovered, but that the flanks are protected by metallic nets (*f*, *f'*). Again, the squadron may be anchored in such a narrow channel that there is less than 100 metres distance on each flank, so that no auto-mobile torpedo-boat could manœuvre between the ship and the shore. Under these circumstances, the spar torpedo-boat (*p*) would fulfill the conditions better than would the auto-mobile torpedo-boat (*l*), since this latter, if it had to manœuvre from ahead of the squadron, would discharge its torpedo at such an angle that its efficiency could not be counted upon.

VIII.

It still remains for us to discuss the question concerning an attack by torpedo-boats upon ships or a ship under way.

Let us recall the fact that the discharge of the auto-mobile torpedo is subject to grave drawbacks arising from a false appreciation of the speed and course of the enemy, and furthermore, that this is aggravated by darkness. At the outset, to aim at a moving target with a vessel which itself acts as a gun-carriage, especially where there is a little sea on, constitutes a very delicate and involved operation, very much more difficult than where the auto-mobile torpedo tube is installed in a ship of some size. Admitting that an auto-mobile torpedo can be discharged effectively 400 metres from an anchored enemy, we are generous when we allow 200 metres as the effective range of an auto-mobile torpedo-boat firing at a vessel under way.

FIG. 14.



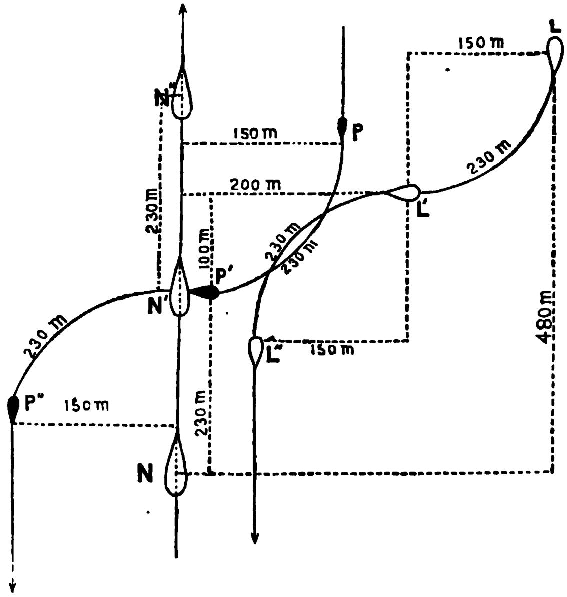
Suppose a vessel (*N*) with a speed of 12 knots (see Fig. 14), is obliged for some reason to follow the line *N*, *N'*. An auto-mobile torpedo-boat *L*, going at 18 knots, which has been discovered by the ship bearing forward of her starboard beam, so directs her course as to arrive at the point *L* abeam of *N* when she is at *O*, and 200 metres off. Here she discharges her torpedo, which has a speed of 24 knots. This done the boat turns through the arc *L*, *b*, *L'*, and moves away in the direction *d*.

The ship has opened and ceased fire at a distance of 1200 metres. Without entering into the calculation as to the time the auto-mobile torpedo-boat is under fire, we will say that it is $2^m\ 53^s$.

Now let us look into the movements of the spar torpedo-boat (*P*), manœuvring under the same conditions. If it should fail to explode its torpedo under *N*, it will go astern of the ship at *O*, then describe the arc of the circle *O*, *f*, *P'*, and run off in the direction *e*. Therefore it would be under fire hardly any longer than the auto-mobile torpedo-boat L. If, however, P succeeds in exploding his torpedo under N, he will remain stopped before the explosion and after it during a time hardly exceeding 30 seconds, then the ship would have forged ahead sufficiently to permit him to describe the curve of P'. The torpedo-boat P then would have remained exposed to the enemy's fire for about the space of 3^m 23^s.

Let us now consider the case of an attack by an auto-mobile torpedo-boat coming down from ahead upon a vessel which is obliged to follow the course N', N', N''. The torpedo-boat has a speed of 18 knots and the vessel (N) 12 knots (see Fig. 15). Fire commences and ceases

FIG. 15.



at 1200 metres. L, L', L'' indicate positions of the torpedo-boat as regards the corresponding positions of the ship N, N', N''. The torpedo-boat discharges its auto-mobile torpedoes from a distance of 200 metres, and then describes a curve of 150 metres with a speed of 12 knots. The torpedo is supposed to travel with a speed of 24 knots. Now, if we calculate the time during which L is under fire, it will be found to be 2^m 51^s,—that is to say, only 2^s less than is the case in Fig. 14, or the time taken up to describe the curve L, L', which slight difference is owing to the fact that you are attacking a vessel which is approaching you. P, P', P'' shows how a spar torpedo-boat would take up corresponding positions to N, N', and N''. From the figure it will be seen that P will not be under fire hardly any longer than will L, but charging the greatest amount of time that might be so taken up against P, it will not exceed 30^s. So that P's time will be $3^m\ 21^s$.

Finally, suppose instead of L and P coming down from ahead they came up in N's wake. The time for L under these circumstances would be $9^m\ 29^s$, and for P about the same. It will be seen that it is always a disadvantage, for this reason, to approach your enemy from a direction on her quarter.

We have now, in a certain way, given a few theoretical examples concerning attacks by torpedo-boats on ships. We say *theoretical*, because the ship has been considered either as anchored, or has been confined to a straight course. Neither of these conditions would govern a vessel (except in the case of a squadron moving along a channel to enter and capture a port), still, the simple calculations which we have given suggest two important remarks:

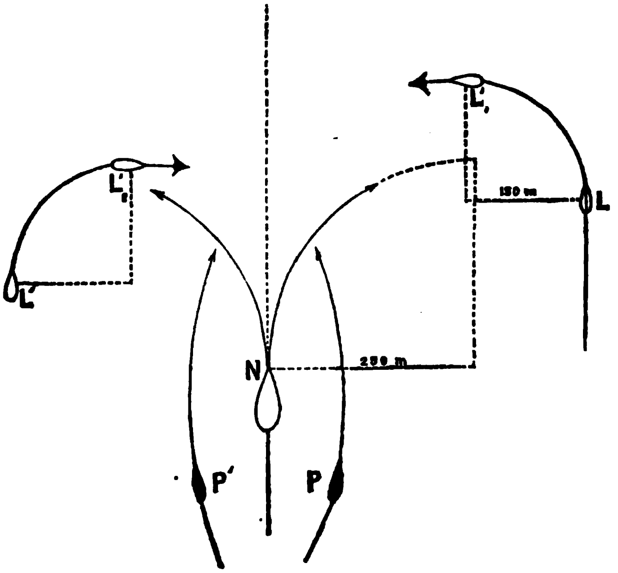
1st. In the 2d case of Figs. 14 and 15, the time during which a spar torpedo-boat remains exposed to an enemy's fire only exceeds by about a sixth the time passed in an analogous situation by an auto-mobile torpedo-boat, and in the case given in Fig. 16, this time is even a little shorter for the spar torpedo-boat than for the auto-mobile torpedo-boat.

2d. A torpedo-boat, of whatever description, does not gain anything in the way of time by coming down from ahead on the enemy (as shown in Fig. 15) over an attack made on the enemy by coming up at right angles to the enemy's course (as shown in Fig. 14). More than this, the manœuvre in Fig. 15 is more delicate, and there are fewer chances of the attack being successful. It obliges the torpedo-boat which undertakes it to remain a comparatively long time under fire at short range, if having missed exploding his torpedo effectively, he wishes to try it again. On the contrary, it is relatively easy for a torpedo-boat lying off the bow of a vessel steaming ahead to attack her on the bow at right angles to her course as shown in Fig. 14, since it can at any moment change the direction of its head so as to engage the enemy by steering for her on the shortest line connecting them.

It is evident that in daylight, the attack by one or more torpedo-boats on a ship under way and free in her movements will, in practice, not be governed by the conditions we have discussed, but at night such a condition of affairs might easily exist. Now, how will a vessel free in its motions act? She will certainly try to avoid being put in a position shown in Fig. 14, therefore she will either try and run over the attacking boats, and sink them with her ram and machine-gun fire, or she will run away. We believe that in the majority of cases this last manœuvre will be the one executed. We have seen that this condition of affairs puts ordinarily a chasing torpedo-boat under the vessel's fire for ten minutes or longer; something hardly to be thought of, so far as considering this a proper manœuvre for the torpedo-boat during the daytime. However, during the night, even with electric lights, we know that the torpedo-boat could with profit chase a flying enemy. But under these circumstances the spar-torpedo is a better weapon than is the auto-mobile torpedo, since the aim with the last would be inaccurate; and furthermore the former would have the advantage of gaining 20 seconds or more on the latter, for the reason that the auto-mobile torpedo-boat would have to head for the enemy at a point *right abeam* of her, and 100 metres off, in order to fire her torpedo with a chance of success. It may be though that this seeming disadvantage for the auto-mobile torpedo-boat is offset by the danger that the spar torpedo-boat runs by having to absolutely touch the enemy, thereby encountering heavier fire, and perhaps a counter torpedo and hand grenades.

At the outset, let us consider a ship menaced by two auto-mobile torpedo-boats (see Fig. 16), *L* and *L'*, and by two spar torpedo-boats,

FIG. 16.



P and *P'*. The first mentioned are obliged to run past *N* to attack, one on the starboard side, and the other on the port side, leaving between them a space of 500 metres; at this distance, in night-time, they will not be able to attack simultaneously, as they ought, since they could not see one another; for instance, the starboard one might run beyond her consort and may be at *L*, the desired spot, while the other only gets to *L'*. At this moment the ship *N*, whose turning radius is 250 metres, would only have to change course 8 points to starboard to make the attack miscarry. The two spar torpedo-boats *P* and *P'* can, on the contrary, act together, as they can keep near enough together to see each other. Should *N* turn in any direction, they can do the same. Should the two auto-mobile torpedo-boats both attack on the same side, *N* can always keep away from them by turning, and can extend the time of their being under fire long enough to destroy them.

Nevertheless, there are certain circumstances which present themselves, where an auto-mobile torpedo-boat, whether crowned with success or not, offers so many chances of impunity from punishment by machine-gun fire, that there should be no hesitation to attack and profit thereby. During a sombre night she could, for instance, steal upon a vessel within 200 metres, no matter if the enemy was furnished with electric search lights, and discharge her two torpedoes, and draw off without being seen.

Although single vessels will not follow certain courses such as we have supposed *N* to do in Figs. 14 and 15, still, when we commence to look into the movements of a combination of vessels formed in file (line ahead) to force a passage we encounter a state of affairs resembling for each vessel the one we have laid down in the diagrams referred to. In effect, each ship must follow her leader to prevent breaking up the formation or to escape dangers, generally a narrow channel filled with natural or artificial obstacles.

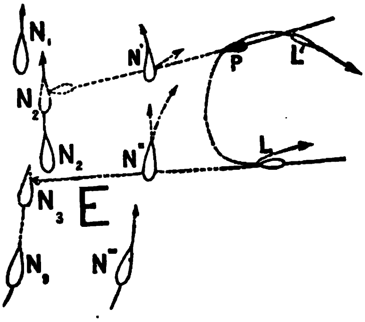
If possible, torpedo-boats in attacking squadrons trying to enter a harbor should unquestionably take advantage of ambuscades, natural or otherwise, and should endeavor to appear and discharge their torpedoes on a line perpendicular to the enemy's course.

Now, for such a manœuvre which is best, an auto-mobile torpedo-boat or a spar torpedo-boat? Let us see! The time that the last mentioned will continue under the fire of a single ship steaming ahead maintaining its course, we have already said, only exceeds by one-sixth the time applicable to an auto-mobile torpedo-boat under the same circumstances, but we will see that a spar torpedo-boat when it encounters a *squadron* has its proportion of danger made much greater than that which obtains to the auto-mobile torpedo-boat doing the same thing.

In our opinion a squadron will attempt to force a passage, into a harbor for instance, formed either in *file* (line ahead or single column), or one of its derivatives.

Let us consider the case of a squadron entering formed in *double file* (two lines ahead or double column). Distances, one cable; intervals, two cables; speed, 10 knots (see Fig. 17). A spar torpedo-boat (*P*) coming down from forward of the beam of the leading ship of the enemy (*E*) manœuvres to explode his torpedo against the broadside of N'. It will take him longer to disengage himself from his opponent, since the vessels $N,''$ N_1, and N_2, etc., will prevent him from circling.

Fig. 17.



Now, less than 40^s suffices N'' to come 200 metres and come to the rescue of her consort, N'. Therefore N'' can turn slightly to starboard, and not only add her fire to N''s to disable *P*, but in all probability she could run *P* down.

If *P*, on the contrary, has failed to explode his torpedo, and passes astern of N' in hopes of picking up N_2, for example, he would find himself between two lines of the enemy, and in a fire which he could not stand. An auto-mobile torpedo-boat, however, could advance to within 200 metres of the passing squadron, discharge its two torpedoes, and withdraw, either on the arc *L*, *L'*, or by working its head in the other direction. Besides this, if the torpedo is arranged to 650 metres, it is possible that missing a vessel in the right column it might pick up a victim in the left one.

We here see that the auto-mobile torpedo-boat has a certain advantage over a spar torpedo-boat, but in an action such as we have pictured we think the spar torpedo-boat has a part to play, and that therefore she should not be omitted from the economy of the defense.

In the condition of affairs of an enemy's squadron entering a harbor and being attacked by a fleet of vessels defending the place, should the action become a *mêlée* the spar torpedo-boat would have a great advantage over the auto-mobile torpedo-boat, as the latter would be afraid to use her torpedoes when an enemy missed might mean a friend destroyed.

IX.

It only remains for us to recapitulate as succinctly as possible the conclusions we have arrived at in this paper.

As far as fighting-ships are concerned, we believe:

1. The uncertainty of the course pursued by the auto-mobile tor-

pedo, added to the small number that a vessel carries, makes it necessary, when used against a vessel under way, that it be fired at short range, within the limits of 50 metres and 200 metres.

2. Divergent torpedoes, notwithstanding the element of uncertainty attending their use, are able to render, in a defensive capacity, great service to vessels menaced by the rams of the enemy.

3. On vessels principally destined to fight as rams in combats with single ships, tubes for auto-mobile torpedoes, which tubes are capable of being trained, are better installed when on the bows and quarters than they are when placed in broadside.

4. Divergent torpedoes cannot be used with any advantage on board of vessels having twin-screws or other means of changing direction quickly.

5. On board of large cruisers, which are not armored, where the gun is the principal weapon, and where the turning-circle is large, discharge-tubes should be placed in broadside as well as on the bows and on the quarters.

6. On board of these same vessels, divergent torpedoes could be easily and effectively used, especially against an antagonist whose weapon is the ram, and whose turning facility is great.

7. In a contest between unarmored cruisers having good artillery and turning power, broadside tubes increase in importance, while divergent torpedoes grow, at the same time, less useful.

8. In cruisers whose size is such that room cannot be spared inside for installation of the discharge-tubes either on the bows, broadsides, or quarters, the tubes should be placed in the bow near the stem rigidly in the keel-line, in the same manner as torpedo-boats are fitted.

9. In a running fight, either in chase or in retreat, the bow and quarter-tubes are of the most use.

10. In ships intended for the line-of-battle and to fight in squadron, the broadside installation is probably the point of greatest efficiency.

11. In a *mêlée*, auto-mobile torpedoes are as dangerous to friend as to foe, and must be used with the utmost caution.

12. Under the same circumstances divergent torpedoes may be of great service, but always as defensive weapons against the enemy's rams.

13. The use of auto-mobile torpedoes does not seem to have modified the tactics of combats on the open sea in any way, except in some special cases, as for instance, fighting in chase or in retreat.

As regards the use of torpedoes in torpedo-boats, we will first consider them as making an *attack against an anchored vessel.*

1. In an attack, the time during which a spar torpedo-boat will remain exposed to the enemy's fire will be greater, in daytime, within limits varying at a maximum between one-third and one-seventh; in night, within probably a greater proportion than that passed in a similar situation by an auto-mobile torpedo-boat; but the resulting increase of danger, even though the necessities of the case demand that the enemy shall be approached near enough to touch him, will not be so great as to justify the abandonment of an attack with spar-torpedoes when the surroundings are otherwise favorable to this class of operations.

2. It is to be desired that spar torpedo-boats of great speed should be provided with two spars, one having a torpedo on it to blow up the obstructions surrounding the enemy, and the other torpedo to explode against this latter.

3. Auto-mobile torpedoes are best used on a night relatively clear and without fog, with a calm sea, when there are weak currents or none at all, and when the enemy is defended with obstacles of less resistance than metallic nets.

4. Spar-torpedoes are, on the contrary, best used on a dark night, and with the water a little rough, in the midst of strong currents, and against vessels strongly defended with obstacles.

5. Gun-vessels and tenders, fitted with spar-torpedoes, can be acceptably used under the conditions of paragraph 4. They should be accompanied by steam launches.

In regard to attacking *vessels under way:*

1. There is hardly any difference between the time that an auto-mobile torpedo-boat and the time that a spar torpedo-boat will be exposed to the enemy's fire.

2. The attack should be made if possible on a course cutting the enemy's course at right angles. Therefore the boats must come down from a position forward of the enemy's beam.

3. An attack in daytime, made by torpedo-boats on a ship or ships under way, having good speed and not confined to a certain course, is hardly to be contemplated, except in very exceptional cases.

4. To attack a vessel at night, free in its movements, it is better to use a spar torpedo-boat than it is to employ an auto-mobile torpedo-boat.

5. For an attack, either in daytime or night-time, against a squadron which attempts to force a passage, auto-mobile torpedo-boats are greatly preferable to spar torpedo-boats.

6. Finally, these last seem to have an advantage over the former in any *mêlée* where an enemy's squadron is opposed by one of your own.

OUR LONDON LETTER.

LONDON, December 3, 1884.

In this, my opening letter to the new quarterly eclectic that is to be launched the first day of the New Year, on what I sincerely trust may prove to be a most successful career, I cannot do better than accord the premier consideration to the topic that has created an unparalleled state of excitement in naval circles, both here and elsewhere, while engaging the most serious attention of all interested in England's greatness. I refer here to the startling revelations recently adduced as to the inefficiency of the British navy.

For some time past comparisons have been instituted between the English and French navies, to the great detriment of the former, mainly by an admiral of the fleet, Sir Thomas Symonds, who has scarcely allowed a week to pass without inditing a letter to the press on this subject, in which work he has been ably supported by other eminent naval officers and by the press generally; but it has remained for the *Pall Mall Gazette*, in a now world-renowned article entitled "The Truth about the Navy," to forge these separate links in the chain of evidence brought forward to prove the loss of England's naval supremacy into one homogeneous mass. The story therein related presents a sad picture of neglect, and taken as a whole is apparently incontestable, as no authoritative denial of the numerous charges has been yet vouchsafed.

That the situation of naval affairs is considered most serious is further evidenced by the fact that the Council of the Royal United Service Institution, which is in some measure semi-official, convened on Wednesday last a special meeting of naval officers, and expects to discuss a paper which, at their request, had been prepared by Sir E. J. Reed, K.C.B. (late chief constructor of the navy), and one of the leading naval architects of the day, on a text that reads as follows:

What are the most urgent measures that should be taken to increase Her Majesty's navy?

The lecture was delivered to a crowded meeting of representative naval men, and the consensus of the opinions expressed by those who took part in the discussion placed beyond all doubt the fact that the naval strength of England has been allowed to sink below par, and that the most strenuous efforts are needed to enable her to recover her position as the leading naval power, as well as to guarantee to the British empire absolute peace and prosperity.

I have not entered into any report of this lecture, because it has in a most unprecedented manner been published in detail in most of the London naval papers, and because I feel sure our naval cousins on the other side of the pond will have followed every step in this great question with their accustomed interest and acumen.

Last night was enacted the final act for the present in this naval drama, when the First Lord of the Admiralty (Lord Northbroke) in the House of Lords, and the Parliamentary Secretary of the Admiralty (Sir T. Brassey) in the House of Commons, submitted the views of the government as to the condition of the navy, and, inconsistent as it may seem, though not admitting the alleged inefficiency, yet they proposed an extra expenditure of some three millions sterling for the purpose of building new and improved ships of different types and torpedo-boats, but which sum is to be spread over a period of five years, and this is the feeble result of the late agitation.

It is hardly to be supposed that the matter will be allowed to rest here, though whether it will be possible to arouse the country from the apathetic indifference usually displayed in all naval discussions, and oblige the public to open their eyes to the real "Truth about the Navy," remains yet to be seen.

What are the causes that have so suddenly induced the government to concur in voting a large additional expenditure to the ordinary naval estimates, is the question that will occur to the British taxpayer on learning the results of the debate last night; and if now necessary, why not, he may well ask, last spring, when the annual vote for the navy was passed by Parliament, and therefore accepted as being then sufficient.

The present condition of naval affairs in Europe can hardly be defined as indicating any greater probability of war than has been the case for the last ten years.

France is certainly approaching the period when the programme of naval construction she set herself to perform in 1872 will be finished, but it seems from reliable sources that France is of late inclined to relax rather than increase her efforts in this direction, though I confess great uncertainty exists everywhere as to what she has actually done and intends doing, no two persons agreeing in their accounts of the actual and probable strength of the French navy now and in the immediate future. Italy is still at work endeavoring to form a powerful navy, but powerful not in the numerical sense, but in the power of individual ships. Russia has recently determined to add to the strength of her ironclad fleet, but it will require many years before she can possess even a second-rate navy, while Germany and Austria seem to confine their efforts principally in the direction of small ships and torpedo-boat flotillas.

Against these continental doings, England can show a fairly steady increase of her navy generally, excepting in regard to torpedo-boats; but then England it is declared must not be content with an equal or bare superiority in point of numbers and class, in comparison with any other naval power, but must aim to secure a preponderance in her favor in the proportion of at least three to two of every type of vessel which together constitute a navy, and therefore those who have organized the present agitation urge the necessity of her doing more than merely keeping pace with other countries in a style commensurate with her greater interests, her greater naval duties.

Further, one can hardly be termed an alarmist who, looking at the present situation of affairs in Egypt, China, and Madagascar, views the possibility of one or other of these delicate operations leading at any moment to a crisis ending in war.

In fact, it is thought that the alleged unprepared state of the British navy has been, in some measure, the cause of the present vacillating policy of England in Egypt, where a more determined line of action, so urgently desired, might bring on a rupture of peace, unless it were supported by an overwhelming naval superiority.

These I believe to be some of the currents which have lately caused the agitated flow of opinion forcing the immediate and decided increase in England's first line of defense.

The expedition to Khartoum is progressing as satisfactorily as can well be expected in the face of the extreme difficulties of transport on the rapidly-falling waters of the Nile, with its continual succession of more or less dangerous cataracts.

The first boats with troops have succeeded in passing the third cataract, which is met with at Hainek, a place some two hundred and nine miles from Wady Halfa, and five hundred and fifty miles from Khartoum, and it is anticipated that most of the troops will have reached the latter place about the end of this month.

The first detachment of the Guards Camel Corps are still farther on their road, having reached a place called Handak, and joined the mounted infantry already there. I will mention here a curious feature of this expedition, which is, that General Lord Wolseley has offered a prize of one hundred pounds to the battalion which makes the quickest passage from Sarras to Debbch (three hundred and two miles), and has further declared his intention of according to it the place of honor, if circumstances permit, in the final advance on Khartoum.

The Camel Corps are reported to have become very efficient in the management of their strange beasts, and though they make a somewhat curious appearance, this mounted corps will, it is expected, prove of considerable utility for scouting purposes.

The policy of delay and procrastination characteristic of the government in their actions throughout the whole of the Egyptian business, may be adjudged to have caused much of the trouble and difficulty met with so far in the transport of the eight thousand troops and their commissariat up the Nile, as well as the great loss of time by reason of their not permitting Lord Wolseley to carry out his original well-conceived plan of purchasing twenty of the Yarrow type of stern-wheelers, instead of which for some inexplicable reason an increased number of the now well-known Nile rowing-boats were ordered in their stead, which boats have caused an endless amount of fatigue and trouble in tugging and hauling them up this river and over the cataracts. At the last moment, however, after the expedition had started, two of these stern-wheelers were ordered from Messrs. Yarrow & Co. One was at the time actually ready for delivery to a private firm, and was sent off at once to Alexandria, from which place it has been successfully carried overland to Shendy, where from latest advices I learn it has just been launched: the second vessel was laid down and completed in the incredibly short time of seventeen days, and was launched on the Nile at Alexandria within six weeks from being ordered, and the promptness of this work is all the more commendable as the vessel had to be packed in hundreds of separate parts, and put together on arrival at its destination.

On the advice of four American captains specially versed in the management of light-draught steamers on rivers similar to the Nile in respect to its fierce current and rapids, whose services were engaged by the government for these stern-wheelers, it was decided to steam this second Yarrow vessel the whole way from Alexandria, as these captains reported that the Nile in their opinion did not present any insuperable difficulties to the ascent of such a craft.

After interminable delays this Yarrow stern-wheeler has left Alexandria and succeeded in reaching Assousan, passing easily the cataract at that place; the passage from Cairo, four hundred and fifty miles, being the quickest on record, though she was towing two boats having a load of thirty tons.

The Yarrow stern-wheelers are well known on the rivers in Brazil, and have always given the greatest satisfaction. I mention this because it has been reported that they had not given very great satisfaction to the English officials in Egypt, apropos of which I will relate the story of the trial of the Yarrow stern-wheeler at Alexandria, premising it with the information that this vessel, when properly loaded, draws only some thirteen inches of water, and is capable of steaming thirteen miles per hour; while on the occasion I refer to she was loaded to excess, and then at the last moment the general officer for whose satisfaction the trial was made came on board accompanied by a *hundred* guests, thus destroying the special attributes of this type of vessel, namely, extreme lightness of draught and considerable speed.

The latest news from Khartoum is to the effect that General Gordon is much straitened for provisions, but it is to be hoped that this wonderful soldier will be enabled to hold out until Lord Wolseley's arrival, which should come to pass at the end of this month, though to effect this the most strenuous efforts will have to be made by one and all forming the expedition. The Mahdi, it is said, is now at Marquiat, on the direct Ambukol and Khartoum route, and rumor reports that he is making constant attempts to capture the burderman earth-works. The latest telegraphic news, however, is to the effect that the Mahdi is dead, and that his followers are rapidly dying off.

A good story is told of General Gordon, which is so apropos of him that I give it for what it is worth, which is that the Mahdi sent a message to the general to the effect that he would await the drying up of the Nile before making his grand assault on Khartoum, to which the general laconically replied, "If you are the great prophet you proclaim yourself to be, then prove your power by drying up the Nile now, and I will open the gates to you."

Suakim is still the scene of daily attacks, but resists all Osman Digna's strenuous efforts to capture it.

The expedition to Bechuanaland under the command of Sir Charles Warren has arrived at the Cape, but from the intelligence lately received it would appear as though the difficulties with the Boers have been practically settled, though, as the government are not quite in accord with the views of the Cape authorities as to the terms of the settlement, the presence of Sir C. Warren, supported by an armed force, may yet be requisite to finally arrange matters.

The colonization rage still continues, and every day one hears of the annexation of some fresh bits of territory or occupation of some new ports by one or other of the powers. Germany has recently proclaimed a protectorate over the territory on the southwest coast of Africa comprised between the Orange River and 18° south latitude, and twenty miles inland, with the exception of Walfisch Bay and the surrounding British territory, and she has created a German settlement at the coast port of Angra Requena, 27° south latitude. Italy intends to occupy Zoulla, on the Abyssinian coast line, where she already holds the ports of Massonah and Zeila, the former between 15° and 16°, and the latter 11° and 12° north latitude. Then the Berlin Conference is briefly engaged in arranging the proper disposition of territory on the west coast and interior of Africa, as well as the rights of control over the great Niger and Congo Rivers. England has also within the last few weeks proclaimed her protectorate of New Guinea, and has gone so far as to appoint a high commissioner, General Sir E. Scratchley, R.E.C.M.G., who has already left for his post. France is likewise occupied with the conquest of Tonquin, and annexation of Formosa in China, in addition to her operations in Madagascar.

The French war of reprisals in China is at a standstill for the moment, as it has been decided to await the arrival of reinforcements both in Tonquin and at Formosa, before proceeding to prosecute further operations. In the mean time the Chinese have taken fresh courage from this enforced cessation of hostilities on the part of the French, and are apparently determined to pursue a vigorous policy. The Chinese claim to have been generally successful in their recent raids on the French advanced posts in Tonquin, and to have sunk a French gunboat and two launches. I also learn that the Chinese have at last organized a fleet of twelve war-ships for the relief of Formosa; this squadron is composed of ships taken from the Shanghai and Tientsin fleets, and will be, therefore, a fairly powerful one; and as it is said that several German naval officers are on board the squadron, though it is actually under the command of a Chinese admiral, it may be that this squadron will cause Admiral Courbet considerable trouble, and may even prove successful in raising the blockade. The fighting efficiency of each of the Chinese ships is comparatively great, but of the *personnel* is extremely doubtful.

The French naval operations at Foochow, Tamsin, and Keelung, present a curious admixture of pluck and cunning, especially in the first case, where by a *ruse de guerré* Admiral Courbet succeeded in vitiating the Chinese defensive measures at that port, by getting as it may be said behind the scenes before the curtain is drawn up at the commencement of the performance.

I venture to say that the statement as to submarine mines being laid at Tamsin by the Chinese is altogether erroneous. The Chinese have certainly spent large sums of money in purchasing all kinds of torpedoes, but no attempt has been made to organize a plan of harbor torpedo defense, and with the exception of the two or three principal ports, no submarine mines have ever been laid down, and at those places only for experimental purposes; in fact, it is no exaggeration to affirm that the practical knowledge of torpedo warfare of the Chinese is absolutely *nil*. I do not anticipate that the French will experience much trouble in clearing any harbor in which the Chinese themselves have placed submarine mines.

I am in a position to state that the paragraph which appeared lately in one of the service papers here, in reference to the submarine boat constructed at Messrs. Palenkrantz's works at Stockholm, is entirely incorrect, for no such vessel has been supplied to the French, nor has one been ordered by the Italians. The submarine boat alluded to still remains at Gothenburg awaiting completion, where she was successfully steamed to from Stockholm last year, though experiencing some heavy weather on her voyage. I have been informed by the gentleman under whose supervision she was built, and who has made several experiments with her both in manœuvring above and beneath the surface, that she has realized all his expectations in regard to safety and handiness, while no trouble has been experienced by the crew in working her when fully submerged by reason of too great heat, or want of oxygen.

If the employment of submarine boats be ever admitted, then I believe the method (side screws) by which this vessel is submerged to be the only feasible one consistent with safety, as the actual buoyancy of the boat is not destroyed in submergency, but only overcome by the action of these side screws, so that any failure of the machinery working these screws would but cause the boat to regain the surface. This mode of submarine warfare does not, however, yet appear to be appreciated by naval officers generally.

The rifle question still occupies the most serious attention of the military authorities both here and on the continent, mainly in the direction of the reduction of calibre, and I learn that the adoption of the new Enfield Martini rifle (4-inch calibre, 1560 M. V.), of which two thousand have been served out to various regiments for trial, has not yet been finally decided upon, it being in contemplation to still further reduce the size of the bore to something between that and the 7½ mm. (.295 inch) calibre now being tried on the continent by several of the military powers. The object of thus reducing the calibre of the future rifle is for the purpose of obtaining as high a muzzle velocity as is possible in conformity with the other necessary qualities of such a weapon, by which a much flatter trajectory and consequently increased point-blank range is secured. For instance, a rifle having a calibre of .37 inch has given a muzzle velocity of some eighteen hundred feet, which means a point-blank range of five hundred yards. By this means the fullest advantages would be secured to the rapid-firing magazine-rifle and small-bore machine-gun, as the sights need not be raised or the weapon laid except for direction for any range up to five hundred yards; and though the actual killing power of this kind of rifle would not possibly be so great, yet it is really more advantageous to wound than to kill the enemy. The smaller bore rifle cartridge would also be somewhat lighter than the present one, which is an obvious advantage.

In respect to magazine-rifles considerable difference of opinion still exists as to their adoption, though doubtless as soon as a really effective one is brought out the obstacle in the way of the introduction of this rifle will be cleared away; and once adopted by either of the principal military powers in Europe, its universal employment will speedily follow.

The rifle-calibre machine-gun is also slowly but surely making its way to the favorable notice of military men, and time alone is needed to see this weapon accorded its place in the army. In India, for instance, some very exhaustive and practical experiments have been carried out this year by the military authorities at Bangalore and Poonah, in which various kinds of small-bore machine-guns have been pitted against bodies of infantry soldiers and batteries of mounted guns. The reports of these trials are not yet to hand, but I hope to be able to give a *résumé* of them in my next letter.

In the course of last summer at Belgrade a Nordenfelt five-barrel rifle-calibre gun was tried in the presence of his majesty the king of Servia, with a company of infantry soldiers, and, as being the latest military experiments in this direction, I think the results will be of sufficient interest to permit me to record them here.

The machine-gun was first tried for rapidity, with the result that one hundred shots were discharged in eleven seconds, and then for accuracy, against a ten-inch square target, placed at five hundred and forty-seven yards distance. Fifty shots were fired, with thirty hits, equivalent to sixty per cent. of hits. The gun was then pitted against fifty infantry soldiers armed with an improved Mauser rifle, the men standing in single line, and, together with the gun, placed at five hundred metres (five hundred and forty-seven yards) distance from a three-metre (ten inches) square target. The Nordenfelt five-barrel fired four hundred shots in fifty-six seconds, with one hundred and thirty-seven hits, as against three hundred shots in forty-eight seconds, with forty hits, for the *fifty* riflemen. Thus, in the same ratio, the latter would have fired three hundred and fifty shots in the same time of fifty-six seconds, with forty-seven hits; or, in other words, it would have taken *one hundred and forty-six* riflemen, with the same shooting accuracy, firing *one thousand and twenty* shots in this time, to have secured the same number of hits (one hundred and thirty-seven) on the target as the small Nordenfelt gun. It seems that the king, not being pleased with the shooting of his fifty infantrymen, ordered them to try again; but the result was not quite so favorable as at the first attempt, and so the original results were adopted in framing the official report of these trials, from which I have taken my figures.

While on this subject of machine-guns I will mention that a complete series of trials are about to take place at Portsmouth for the express purpose of determining certain questions which have arisen as to the best form of naval mounting for the Hotchkiss and Nordenfelt quick-firing 6-pounder shell guns, of which a considerable number have been ordered for the English navy. All who have seen these pretty but deadly weapons concur in pronouncing them to be the most perfect light shell gun extant, and prophesy a great future for them.

The power of these weapons will be understood when I say that the Nordenfelt 6-pounder fired at Portsmouth a short time since pierced a three-inch solid steel plate at three hundred yards range.

By the way, a more euphonious name is much needed for these guns to replace the present nomenclature, "quick," or "rapid firing" shell-guns.

I note that the Australian Colonies have adopted the Nordenfelt system of machine-gun throughout, including the 1½-inch shell gun, 1-inch solid-shot gun, and rifle-calibre guns, and the enterprise of the colonial authorities in respect to the machine-gun question is most remarkable; in fact, in this as well as in other military and naval matters they appear determined to strike out a distinct line of their own, and refuse to have anything to do with war material of any nature unless it possesses all the most recent improvements.

It is rumored that the result of the armor experiments at Spezia, in October, will be the adoption of the Schneider solid steel plates for the new Italian ironclads; but whether this be the case or not, there really was but little to choose between the Camwell (Wilson) and Schneider plates on this occasion, both being easily perforated and broken into fine pieces; still, it is the opinion of most experts that the Camwell plate would have proved to be the most difficult of the two to penetrate if both had been supported by adjacent plates, as would be actually the case when forming part of the armor of a ship, barbette, etc., on account of the greater degree of hardness of the steel in that plate.

The plates were each 18.7 inches thick, and their dimensions were ten feet by eight and a half feet. The new breech-loading Armstrong 17-inch 100-ton and a Krupp forged steel projectile, weighing eight hundred and thirty-five kilos., was used. The targets were placed at one hundred metres distance from the gun, and the total striking energy of the shot was nearly forty-five thousand foot-tons; the muzzle velocity, with a charge of seven hundred and seventy-one pounds of Forsano powder, was eighteen hundred and seventy-four feet per second.

The introduction of these steel projectiles has thus apparently re-established the power of the gun over the armor, but probably the advantage will not be permitted to remain for any long period on the side of the gun.

In Germany a change has lately been effected in the equipment of the cavalry, as it has been decided to attach the sword to the saddle, and carry the carbine on the shoulder, thus reversing the ordinary state of affairs; and though not at first sight a very material point, it is actually of considerable importance as evidencing the tendency to treat cavalry more and more as mounted infantry.

I have but little to record of special interest in the torpedo world, but expect to be able to furnish some important matter in my next.

An Austrian (Petrousky) has invented a novel kind of mechanical submarine mine, which has the special feature of automatically moving itself at a previously fixed distance beneath the surface in any unknown depth of water it may be dropped in; this invention is considered to be exceptionally advantageous on the continent, and a considerable number of these mines have been purchased by Austria, Germany, and some other governments, but as it has not been patented a fancy price has to be paid for the right of using it, and initiation into the secret of its mechanism.

A patent has, I find, been taken out here for a similar system of mine, but not maintained, as the inventor disbelieved in its ever being seriously required; and the advantages of an automatic mooring mine do not seem very apparent at first sight, or anyhow in any degree commensurate with an increased cost.

The important question of controllable locomotive torpedoes for harbor defense is shortly to be reopened by the English, as an improved Brennan, and Lay-Haight, as well as a new electrical torpedo of this class, are being prepared with a view to competitive experimental trials.

It appears that Mr. Brennan, some two years since, brought over from Australia one of his small torpedoes, and the trials with it so satisfied the Royal Engineer torpedo officers that it was decided to build an improved and much larger one under the personal supervision of the inventor, at the expense of the government, and Mr. Brennan's services were secured by a retaining annual fee of two thousand pounds; altogether, this improved Brennan has so far cost some five thousand pounds, including the stationary engine; the intention of the government being to adopt Mr. Brennan's invention outright if his torpedo should prove superior to others of the same class in regard to speed, manœuvring powers, range, and general effectiveness.

The Brennan differs very considerably from the other controllable locomotive torpedoes hitherto constructed, such as the Lay, Ericsson, and others, in that its motive-power is entirely mechanical, while that of the others is either carbonic acid gas, compressed air, steam (liquid fuel), or electricity. The Brennan is provided with two reels, on each of which fine steel wire, in length equal to four times the distance to be run, is wound, and the torpedo is propelled ahead by the rapid unwinding of this wire, causing the reels to be revolved, which by suitable gearing communicates a revolving motion to the screws.

The torpedo wires are unwound by means of a steam-engine fixed at the directing point. I have seen the winding engine for the new torpedo, which has recently been built by Messrs. Yarrow & Co. It develops about one hundred and twenty horse-power, and has cost some two thousand pounds, and it is provided with two drums about three feet in diameter, which can be revolved together or separately; these drums will have to be revolved at four times the speed desired to be given to the torpedo, so that if the latter obtains as expected a speed of fifteen miles per hour, these drums will have to be sped round at the rate of sixty miles per hour.

The range of the new Brennan is to be two thousand yards, with eight thousand yards of wire to be carried on each of the reels in the torpedo. The steering is effected by burying the speed of one or other of the stationary engine-drums, which by an ingenious arrangement in the torpedoes gears in the steering apparatus and causes the rudder to be put over to one side or the other.

The Brennan can also be maintained at any desired depth by an arrangement somewhat similar to that used in the Whitehead, and its course is to be made apparent to the operator at the directing point by a device altogether differing from the rods and disks hitherto used, but which is so far kept secret. It would appear at first sight that the Brennan must necessarily be forced to keep a straight course from the starting-point, but it has been proved that this is not a necessary effect of this mode of propulsion, and that, however often its course be changed, and path of the wire become consequently a sinuous one, the curves are thus maintained throughout the hauling in of the wire, but I believe a mathematical demonstration of this fact is a somewhat difficult matter.

The new Lay-Haight torpedo is to be much larger than any Lay yet constructed, and is said to be capable of a speed of twenty miles per hour, and is to have a range of one and a half miles, but this weapon has not yet been completed. The new electrical torpedo which is being constructed here is also not quite finished, and nothing so far has been vouchsafed as to its capabilities.

I have heard of an Italian Lay torpedo which is driven by steam generated from liquid fuel, and reports state that it has accomplished very satisfactory runs, and further that ten of these torpedoes are about to be built for the Italian government.

I will reserve any remarks as to the comparative capabilities of these new controllable locomotive torpedoes until some reliable data of their performances are to hand; at the same time this species of torpedo, having a high speed and the other necessary qualifications, must prove a most powerful auxiliary to harbor defense, and I have often wondered at the small attention that has hitherto been paid by official torpedoists to developing this weapon.

Considerable attention is still being paid by naval officers here to the further development of the Whitehead torpedo, and I learn that the last one constructed at Woolwich has succeeded in securing a best speed on record, namely, twenty-four knots for six hundred yards; while, as experiments have proved that a greater speed can be obtained from the same torpedo by shortening and rounding its entrance, a larger charge can be carried,—from forty-seven pounds to seventy pounds,—and thus the new Whitehead has been more than doubled in destructive power without adding to its size or weight, and its accuracy also increased, as it can be now depended on to make accurate runs up to a range of six hundred yards.

Naval torpedoists here are also directing their attention to the perfecting of very small Whiteheads, ten feet in length, for the armament of the smaller-sized boats, and it is I hear in contemplation to do away altogether with the use of the spar-torpedo, and an order has already been promulgated to this effect in so far as ship equipments are concerned.

I cannot, however, but believe that this would be a mistake, as the spar has one great advantage over any uncontrollable torpedo in that up to the very moment of exploding it in contact with a ship, it carries with it the intelligence of the officer in charge of the attack, and there will certainly be frequent occasions in war where the absolute certainty of the spar attack may be of great advantage.

It is a rather curious commentary on the development of torpedo warfare, that in the recent attack of the French on the Chinese gunboats at Foochow, the former employed a boat fitted with the spar-torpedo to sink the only vessel destroyed by means of a torpedo, though the French navy is well provided with Whiteheads, and are quite as *au fait* with its use as any other navy, excepting, perhaps, England.

The Turkish naval authorities are, I am informed, still wasting their time and money in prosecuting experiments with rocket torpedoes, for it is generally acknowledged that the difficulties connected with this form of motive-power are almost insuperable. Russia, England, and America have so far vainly endeavored to succeed in this matter, and I can hardly suppose, when these have failed with their immense resources, that the Turks with their very limited experience will be more successful.

In regard to torpedo-boats I have to announce the postponement of the competitive trials that have been instituted by the German government between English and German built sea-going torpedo-boats until the completion of the Yarrow and one of the German competitive vessels; up to the present the experiments have, however, been greatly in favor of the only English (Thornycroft) boat delivered.

I have recently inspected the Yarrow competitive boat, which is the largest torpedo-boat yet constructed, and she certainly is a most powerful craft and a most beautiful model. Her dimensions are, length, one hundred and twenty feet; beam, thirteen feet three inches; and displacement sixty-five tons, and she will carry twenty-five tons of coal. Her full speed is expected to be at least nineteen knots, while she will be able to run at the rate of ten knots for a distance of from two thousand to two thousand five hundred miles without requiring a fresh supply of coal. Her crew will consist of sixteen officers and men, and her torpedo armament is four 15-feet Whiteheads, two ready in the torpedo-tubes, and two in reserve; the torpedoes will be discharged by means of Messrs. Whitehead's system of compressed-air propulsion. The boiler is well protected by the coal-bunkers, which run along on each side and before it, and she will be armed with a machine-gun mounted on her deck abaft. This fine Yarrow torpedo-boat will be delivered to Germany in the course of the next week.

Messrs. Normand & Co. have built a torpedo-boat one hundred and twenty-four feet in length but only eleven feet eight inches beam, while the German Thornycroft one hundred and twenty foot boat is only twelve feet six inches beam as compared with the Yarrow one hundred and twenty foot boat with thirteen feet three inches beam.

It is now considered that the sea-going or first-class torpedo-boats should have the features of great coal endurance, good accommodation, and good sea-going qualities in a very high degree, even if a small sacrifice of speed to attain these objects be necessary. The question of torpedo-boat catchers or destroyers is another important consideration, and it is in contemplation to utilise boats similar to this large Yarrow vessel, but to be armed exclusively with machine-guns, as well as fitted with an electric search-light.

Further, the present ship, or second-class torpedo-boat, which has not proved altogether satisfactory, is to be replaced by a better, possessing better sea-going qualities, and more adapted for performing the ordinary duties of a man-of-war's steamboat, which is to be armed with machine-guns, and are now termed guard machine gunboats.

I have to record the bursting of one of the new 6-inch naval breech-loading guns on board H. M. S. "Active," during some gunnery trials, instituted for the purpose of testing her new armament previous to commissioning. This is but one of several more or less serious accidents which have happened to this type of gun in the past year, during the course of experiments with them at Shoeburyness and Woolwich. The most serious of them occurred last summer, when one of these guns burst violently into a thousand pieces while being proved in the presence of the Heavy Gun Committee; but fortunately no loss of life or limb has to be deplored in this or the "Active" case.

It appears that the "Active's" gun had only recently been placed on board, and not having been fired since its proof-tests, the bore was, as is usually the case, coated with a mixture of white-lead and tallow to prevent corrosion, and, strange as it may appear, the gun was actually fired without cleaning or searching it, and without the precaution of firing a scaling charge (seven pounds) through it. The story of the occurrence is as follows: Three of the gun's crew vouch to having glanced through the bore before loading without noticing any foreign matter, and also that the projectile had been pushed home into its proper position; then half a charge was entered, breech closed, and gun fired, with the result that the chase was split up, and blown completely off. The actual cause of the burst will never be known, but it is on the face of it apparent that it could only have been caused by some obstruction jamming the projectile, which obstruction must have been either the white-lead driven up into a hard mass by the shot, or some small tool left in the bore, such, for instance, as a burnishing file, that might easily have escaped the cursory glance through the bore of the three seamen gunners; further, in its proof-tests this gun had been fired with a forty-pound charge, developing a maximum pressure of twenty-one tons, while the charge used at the time of the accident could only have given a pressure of twelve tons, and an examination of the remaining broken part shows no sign whatever of a flaw in the metal. Lastly, the other 6-inch breech-loading guns in the "Active" have since been fired with safety, but a scaling charge was first fired through each. This accident is yet a further proof of how very narrow is the margin which lies between safety and danger in firing heavy guns.

It has been stated that this "Active" gun was an Armstrong, but this is hardly correct, inasmuch as though it was constructed at Elswick, it was done so under protest, as the design, which was prepared at the royal gun factory at Woolwich, was strenuously opposed at Elswick, but without avail, so that it is in reality a Woolwich gun, and the authorities there are alone responsible for the whole of these guns (one hundred) now ready for delivery to the navy; these weapons may well be termed "lame ducks," for originally intended to fire a battering charge of forty pounds and a one hundred pound projectile, these have been reduced to thirty-five pounds and eighty pounds respectively, which is tantamount to admitting that these Woolwich guns have proved structurally weak.

It thus comes to pass that the English navy are now saddled with a lot of new 6-inch breech-loading guns, which are incapacitated from firing the maximum charge and weight of projectile this type of gun is capable of, in proportion to their size, weight, and cost.

It was not many weeks since that a gun burst at Woolwich by reason of the premature firing of the fuse and explosion of the shell in the bore, and in this case two men and a boy received serious injuries, while only on Monday last an 18-ton breech-loading gun burst at Woolwich while proving gunpowder, the accident being attributed to the quality of the steel portion.

The policy of the British authorities in respect to the construction of all kinds of war material, which is one of entire government manufacture, must and does unmistakably act detrimentally to the interests of the services both materially and financially, and abundant proof of the truth of this assertion is readily forthcoming to any one who chooses to seek for it.

In respect to heavy guns especially it seems to be a most suicidal policy of our government, which, instead of encouraging and increasing private industry in that direction, to her own benefit, tends slowly but surely to destroy it, and further permits all the private skill and enterprise to be exerted in turning out heavy guns, ships of war, torpedo-boats, and other war material for the special benefit of foreign powers, who may any day use these products of her own industry to her ultimate sorrow.

Among the many needs of the naval service may be mentioned that of a really simple and effective range-finder, and I have examined a Danish invention in this direction which seems to be just what is required; it consists of a direct reading sextant and also telescope range-finder, both exceedingly simple and capable of being readily used by any one on board ship. The English naval authorities have sanctioned a trial being conducted with these instruments, and it will take place at Portsmouth as soon as some improved instruments on this principle, including an adaptation of the method to a binocular, are ready, when I shall be in a position to explain the system and report as to their utility.

I find I have forgotten to mention that Sir E. J. Reed, K.C.B., M.P. (late Chief Constructor), was sounded as to his acceptation of the post of Parliamentary Secretary to the Admiralty in the event of Sir T. Brassey, M.P., having refused it, and it is rumored that a post will be found for Sir E. J. Reed at the Admiralty in connection with the constructive department.

I will conclude this letter by mentioning that a further addition has been made to the London service journals by the publication, on the first of November last, of the *Admiralty and Horse Guards Gazette*, which appears to be a most enterprising journal.

C. SLEEMAN.

BOOKS RECEIVED.

Episodes of My Second Life. By Antonio Gallenga (L. Mariotti). J. B. Lippincott & Co. $1.50.

A Penniless Girl. From the German of W. Heimburg. By Mrs. A. L. Wister. J. B. Lippincott & Co. $1.25.

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ARMY AND NAVY QUARTERLY.

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HUMANITY AND WAR.

(Translated from the *Jahrbücher für die Deutsche Armee und Marine* by STANISLAUS REMAK, late First Lieutenant Fifth U. S. Artillery.)

IN one of his comedies, the poet Terence causes the aged, self-tormenting, morose Menedemus, unhappy through his own folly, to be interrogated by his neighbor Chremes as to the cause of his sadness. The sullen Menedemus uncouthly answers his considerate questioner, by in turn demanding of the latter "if he had so much spare time as to bother himself about the concerns of other people." Thus repulsed, the noble and philanthropic Chremes retorts: "*Homo sum, humani nihil a me alienum puto*"—"I am a man, and so I believe that nothing which concerns mankind can be a matter of indifference to me."

This famous utterance, whose initial words "*homo sum*" have recently become universally known through the novel of George Ebers, which is thus entitled, might well be selected as a motto by him, who should undertake to write a history of *the efforts and tendencies in behalf of humanity.*

"*Hunger* and *love*" were named by Schiller as the two great motives actuating mankind;—by "*humanity*" and the "*fight for existence,*" we moderns designate those great streams, which flow towards one another, their currents impelled and directed by the influence of man.

The expression of Seneca: "*Vivere est militare*"—"to live is to battle"—applies everywhere, to all times, for war is coëval with the existence of mankind itself. But as old and powerful as the promptings of *egotism*, which is manifested in the conflict of man with man, so old and mighty are the noble aims of *humanity*, in the widest sense. Let there be eliminated from human intercourse the elevating and praiseworthy impulses and practical manifestations of friendship and fellowship, of compassion and regard, of ready self-sacrifice and the desire to relieve the distressed : let there be taken from man these motives and aims,—and he is robbed of the most ennobling and valuable qualities he possesses.

Deeply implanted in our breasts, like the instinct of self-preservation, we feel the urgency of standing by our fellow-man. Justified in themselves, therefore, in every respect, are the tendencies of humanity, which disseminate themselves everywhere, which vie with one another wherever—to use the words of the poet—" man may be brought in his misery, his suffering."

Running in untroubled times like unto thousands of rivulets, healing the wounds inflicted in the fight for existence, these tendencies are united into greater streams when especially heavy calamities seek out for themselves more extended fields;—where conflagration or flood, where land-slide or earthquake or tornado, where famine or pestilence, suddenly break in upon a region, there, from all parts, the cry of the distressed finds the loudest response. The greater the need, the greater the self-sacrifice, the more substantial the aid. And naturally so: the more notably in the course of time, the education and manners of mankind have progressed, the more have philanthropic tendencies become deepened in practice as well as theory, the higher and more comprehensive aims have they sought. And thus it has come about,—nay, through a *necessity* incident to the very nature of the case, it has happened and happens especially in our time,—that humanity selects for itself war as the *principal field* for its efficient workings.

Truly, if ever human suffering and human misery on a large scale stand in need of aid and comfort, it is in the course of and in consequence of the wars of the latest times, conducted with powerful physical and intellectual resources, and with the most regardless energy.

I. *Humanity*, then,—let it be repeated,—is *justified also*, and *especially*, in *war;* it carries its justification within itself. This view and this conclusion can be qualified and antagonized only by the single, not arbitrary, consideration: *the test as to its propriety and applicability in practice must be forthcoming from a strictly military stand-point!*

But *here* opinions *differ!*

"Can one"[1]—so ask the men of warm heart—"can one ever exercise *enough* works of gentleness and mercy, can humane motives be *trammeled*, can we set *bounds* to the love of our neighbor, to philanthropy, to magnanimity, when we are concerned in carrying light into the gloom incident to the miseries of war: in ameliorating its nameless wretchedness, the bodily and mental sufferings of wounded and prisoned warriors, all the thousand horrors and terrors of the people?"

"No, there is no limit, no bounds can be set, to the practical exercise of humanity in war."—So announce these men of warm heart, and with them, of one accord, are the great, weak, sentimental masses!

Thus one has stridden to it, *utterly to subordinate to the claims of humanity the sum total of belligerent achievements, to humanize the usages of war, and to drag these usages, so humanized, under the title "laws of war," into the doctrines of international legislation.*—

II. Reserved, cold to the heart, we observe opposed to these extravagant views, the conservative and themselves intimately interested and participant individuals, the statesmen, the governing, in especial military men; there reigns a divergence of opinions, leading in almost diametrically opposite directions.

Mighty problems are solved,—new, keen, soul-inspiring ideas are brought forth only,—in a clear head, on a body which enshrines a glowing heart. To be sure, the glowing heart is possessed by those enthusiasts of humanity who would turn the business of war into a lamb-like child's play; but in *this* matter their heads are not clear, nor, for that reason, do they solve the great problem.

When we assist our sick and needy neighbor; when, in consequence of depopulations of vast extent, as pestilence, or floods and other calamities brought on by the raging of the elements, we hasten to the relief of the distressed, this is noble and justified; we do *not* thereby *impair* the *interest*, the *right*, of a *third party*, and humanity may have its sway *untrammeled.*

Quite differently does the matter present itself in *war!*

Each of the contending parties has the like aim, the like interest: subjugation of the antagonist,—and to that end employs *every* available means to bring about the death and annihilation of everything in the way of personal, material, and moral forces, property, and resources, which the enemy may bring into the field. That is the tendency of war; that is the nature, the *right*, of *war*. The belligerent has the *right* to quench the generous impulse which would rise in his breast, to check the kindly sentiment and emotion which would stay his uplifted arm, which would *heal the wounds of the enemy*, and thus give to that enemy renewed strength.

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[1] "Rights and Limitations of Humanity in War. By Dr. Carl Lueder. Erlangen, 1880,"—an essay embodying excellent views, which can be, in almost every detail, concurred in from a military stand-point.

Here, then, is the tangible point of the conflict: humanity and war, in essence and tendency, are *expressed contradictions*, and if they come into unavoidable contact, either the one or the other must give way or suffer an injury.

Now, it is reasonable, that in war, *war* must have the first place and *not humanity;* that we are concerned with the iron rules and necessities of war and not with the artificially built-up paragraphs of a statutory "code of war." And as this is logical, so it is conformable in practice: before the tremendous *realism* of actual war are broken up and knocked into atoms all the *theoretical* and *doctrinary* clauses and shackles, through which a warm-hearted but unintelligent and impractical, a mock, philanthropy, would seek to enervate the mightiest act of the fight for existence.

III. And the *military men by profession*, to whom comprehensive knowledge of the essentials of war is in largest part to be attributed, occupy, *just on this account*, a reserved position towards these *over-enthusiastic* tendencies of humanity. But as little as these latter are to be commended, so much are to be condemned those extreme views in another direction, not frequently, it is true, avowedly expressed, which views naturally find their principal supporters in the ranks of the officers, concerned as to their liberty of action: "that, namely, in war, *there can in any event be no question* as to considerations of humanity and all tendencies in that behalf would have to be disregarded at the outstart as unintelligible and irrelevant; apart from this they would be *impracticable*."[1]

The truth lies here, also, half-way between;—as Lueder very appositely determined:

IV. "Humanity is *justified and permissible in war*, but *only in so far as the nature, attributes, essentials*, and *aims* of the war *admit* of it." In other words, it is, under no circumstances, to be demanded that the war shall be conducted only within the bounds which humanity shall please to prescribe for it; but, *vice versa:* humanity in war can only in so far be entitled to consideration, as shall be consistent with the nature and aims of the war.

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[1] Lueder.

V. If, hitherto, from the inherent attributes of the two factors, "war" and "humanity," there have been deduced, in academical fashion, the bounds within which these must be confined, there would remain an explication of the necessity and correctness of this admeasurement, as applicable to concrete cases.

Engrafted into the subject, craving recognition, there are invited for our consideration, and we may bear in mind, a few matters which have been *historically* communicated to us. The formidable extent of the material at hand compels us to limit ourselves to few examples and dates and to the most succinct, nay, aphoristic, presentment.

From the earliest times up to our own day there have been people who have rhapsodized in the hope of, and in the faith in, a golden era, wherein perfect peace, absolute harmony, should prevail on earth.

Regardless of the characteristics of man, whose entire nature would have to undergo a radical change, never and nevermore to stray into conflict and strife, loth to admit "that there has been no moment in all history, in which the innate culture of mankind has been so comprehensively and powerfully enhanced, as in war;" taking no thought of the fact that time out of memory the fates of nations and states have been decided in the struggle between the nations on the field of battle, —as Leopold von Ranke, in his very recent general history, bears witness: "military necessities now rule the world!"—; not to be disenchanted by any or all of these undeniable and plainly-speaking signs and occurrences of actual life, these good people persistently cherish that most philanthropic of all ideas, "*the idea of eternal peace*," that utopia, which His Excellency von Moltke refers to in the most annihilating terms in the letter which, in December, 1880, he addressed to the now recently deceased, well-esteemed, and highly eminent publicist, Professor Dr. Bluntschli, of Heidelberg.

"Eternal peace,"—says the Field Marshal,—" is a dream, and not even a beautiful dream! In it are unfolded the noblest virtues of mankind: self-abnegation and courage, devotion to duty and self-sacrifice, with the laying down of life. Without war, the world would be sunk in materialism."

Quite naturally, this judgment of the veteran leader has not gained the concurrence of the masses!

"Eternal peace!" Yes, this dream has come to many at certain epochs, especially in times of plenty and inactivity, after the strain of tremendous convulsions and the exhaustion of the nations; and then the dream has stolen even upon prominent and otherwise clear-seeing men!

I pass over the earlier times.

In TREITSCHKE'S "German History in the Nineteenth Century," we read:

"Even KANT was impelled, through the intelligence of peace from Basle, to write his essay 'on eternal peace,' and to dream of the near approach of the cessation of the 'barbarity of war' at the very hour when a new, iron, era was dawning upon delivered Europe."[3]

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[3] The articles of this treatise are commented upon in a summary and incisive manner by MAX JÄHNS in his discourse "War and Peace. Theories and Practice." Berlin, 1868, E. S. Mittler u. Sohn.

The discourse of Captain von REICHENAU—"Eternal Peace and Disarmament" (Berlin, 1878, Luckhardt)—also shows the untenableness and impracticability of these ideas. On behalf of the latter, however, the pugnacious editor of the propositions of Kant, Mr. KARL KEHRBACH, of Halle, steps energetically into the ranks, and in his polemic introduction furnishes the interesting evidence of the fact that the inspirited disciple of the *theory* of eternal peace can be a veritable *fighter* when it comes to literal hard *practice.* When Mr. Kehrbach maintains, in this introduction, among other things: "In clear, unmistakable words the enlightened founder of Christianity displays as the aim of the religion taught by him, the fraternization of all nations, eternal peace between them;"—"the clearly-expressed tendency of Christianity—peace on earth—must appear irrefutable to us when we bear in mind that in none of the words of Christ can the faintest *intimation* be anywhere found that war is ordained by God;"—when Mr. Kehrbach maintains this, let us refer, *on the other hand,* to the essay of Mr. Division Chaplain G. FINGAD, "Influence of Christianity on War and Warfare," which appeared at Heidelberg in the year 1882; and let us quote from the work of Professor Lueder, already mentioned, the following highly-interesting extract: "The bible does not contain a *single* reference which can be cited in support of the notion of the advent of a state of eternal peace in this age of the world, and *can* contain none such,—many, on the contrary, which evidence the fact that a condition of war among men is recognized and pre-supposed as a matter of course. Hence may be judged the value, or rather the worthlessness, of the assertion, so largely finding credence, which is made by certain apostles of peace as positively indisputable, that the waging of wars is opposed to the injunctions of the sacred scriptures and of Christianity. Brotherly love and peacefulness are, it is true, everywhere prescribed for us, as is the *yearning* after the *greatest possible* perfection, but we shall never *attain* to these things in this age of the world. Only this, not the intentionally or unintentionally erroneous representations of these apostles of peace, is the true doctrine. And even he who should refer to Isaiah ii. 2–4 (almost literally repeated in Micah iv. 1–3), Zechariah viii. 10, Daniel vii. 13, 14, 27, and Revelation xx. 4–6 (promise of the millennium), would see that these verses have not the slightest application to this age of the world. Compare, moreover, for the converse, (that there will be wars so long as this age of the world shall endure), Matthew xxiv. 6–8, Mark xiii. 7, 8, Luke xxi. 9."

Mr. Karl Kehrbach seeks to ascribe to Field Marshal Count von Moltke a contradiction between the latter's before-mentioned letter to Professor Bluntschli and a former one to a Saxon fellow-countryman. Mr. Kehrbach must have failed in the attempt; let there be recommended for his perusal the letter addressed by the veteran strategist, under date of Berlin, February 10, 1881, to Mr. Gouberen, a

Without further commentary the articles of this celebrated treatise "On Eternal Peace" may be here communicated:

Art. 1. "No treaty of peace shall contain the secret provision for another war."

Art. 2. "No state, no matter how small or great, shall be acquired by another, whether through inheritance, exchange, purchase, gift, or conquest."

Art. 3. "Standing armies shall, in time, be entirely done away with."

Art. 4. "No public debts shall be contracted with reference to external affairs."

Art. 5. "No state shall forcibly intermeddle with the constitution and government of another country."

Art. 6, finally "is of a purely technical nature, bearing upon the laws of war, and discountenances the employment of dishonorable and underhanded resources, as calculated to destroy esteem and confidence between the states, even in peace."

These *preliminary*, are followed by three *definitive*, articles:

1. "The civil constitution of each state shall be republican;"

2. "The rights of nations shall be based upon a federation of free states;"

3. "The rights of universal citizenship shall be confined by the conditions of common hospitality," *i.e.*, the nations shall only have a *right of mutual visitation*, but in no case the right of permanent settlement.

To such hallucinations as these did the yearning after eternal peace lead the greatest philosophical thinker of his time,—Immanuel Kant, that strong character, who has given us the "categorical imperative." He wrote thus, while already the terrors of the French Revolution were shaking Europe to its foundations. As ever, in the face of stern realities, the ideas of peace were dispelled in vapor.

VI. Mention should be made of the *Holy Alliance*, concluded in 1815, without the participation of the ministers, by the rulers of Russia, Austria, and Prussia. Under the terms of this alliance, the three monarchs obligated themselves to act in accordance with the precepts of the gospel, and to render aid to one another in the preservation of right and peace, etc. All the rulers of Europe, with the exception of

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member of the association for the reform and codification of the international laws, in which that defender of Bluntschli (Mr. Kehrbach) and his charges of contradiction in the two letters of von Moltke, are summarily met and disposed of. This last writing will be found printed, among others, in No. 21 of the *German Army Gazette* for 1881.

the sultan, the pope, and the king of England, joined the alliance. This *aided* sufficiently long in giving the nations the blessings of peace, but it could not do so for all time to come.

In the thirties, there appeared two men of Anglo-Saxon race,—the one, an American, "the learned blacksmith," ELIHU BURRITT, who founded a "*union of eternal peace,*" "with a view to a democratic brotherhood of all nations;"—the other, the English parliamentarian COBDEN, who aimed at the *reduction of the navy,* and represented the "*principle of non-intervention.*" All these means have had as small effect in doing away with war as the "*international court of arbitration,*" whose inefficiency and impracticability will already have been clearly demonstrated, *eo ipso,* to the student of history, by the fate of the Hellenic amphictyonic councils which aimed at like results. Let us reflect whether anything has been attained by the fact that to the peace of Zürich, in 1859, there was added a supplement, in accordance with which two European powers should not take to arms against one another, without having previously given the other powers an opportunity to make efforts towards a friendly accommodation of differences. Such *courts of arbitration* have, it is true, been resorted to on a number of occasions during the most recent times and have successfully accomplished the reconciliation of difficulties, but only difficulties of the smallest possible occasion and influence. The solitary exception, really of greater importance, was the so-called "Alabama question," which in consequence of Swiss predilection was decided against England in favor of the United States. England paid a reasonable sum; had the conditions imposed been heavy,—veritably, war had been at hand![4]

Well recognizing the great probability that the *governments* would never bring about a condition of eternal peace, philanthropists had encouraged the notion that it was a matter of the *peoples themselves* to move for the achievement of this high aim; *peace societies* were formed and there were gathered periodically *peace congresses,* the most important of which occurred in 1848 at Brussels, 1849 at Paris, 1851 at London, and 1867 at Geneva. At the last there prevailed such a spirit, that the parties almost literally reached the point of perpetrating personal violence upon one another. Every single one brought his "*last war*" on the carpet!— —Practical results failed as a matter of course.

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[4] Compare "Polity and Usage of War. Studies and Views. By W. Rüstow, Zürich, 1876," to which the author of this article is much indebted. With all his deficiencies, but also with all his advantages, the pen of Rüstow treats the subject-matter in the most interesting manner. Not the expression, but the keenness of thought displayed, is to be praised in Rüstow.

As to the most recent times,[5] let there be mentioned the famous scheme of VIRCHOW,—introduced into the Prussian Landtag shortly

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[5] Two letters of most recent date from men high in authority, may here be noted, the value and importance of which will more clearly appear in the further progress of this article. Professor von HOLTZENDORFF, one of our most eminent publicists, who was invited to participate at the Brussels peace conference, and who was besought from London to give a written expression of opinion, in the event of his absence, addressed the following communication to the committee: "MUNICH, 16 October, 1882. GENTLEMEN,—I have received the kind invitation with regard to the Brussels conference, with which you have lately honored me. For this invitation, I take it, I am indebted to the perfectly correct presumption that I cherish a lively sympathy for the objects of the conference. With you I join in the conviction that the expenses incident to inordinate armaments must be diminished, if we are earnestly to take in hand the moral and physical amelioration of the relations and conditions of the people at large as individual members of society. When, notwithstanding, I have resolved not to go to Brussels, it is owing to the fact that I have been influenced by considerations due in part to the general situation of affairs on our continent and in part to that peculiar to my own country.

"The principal object which your conference seeks to attain, appears to rest upon the idea that public opinion in Europe must be stirred up to a more active participation in these aims and tendencies. Public opinion, however, which exerts a greater or less effect upon the governments of civilized states, remains utterly powerless when we have to do with the ebullitions of national animosities among the masses of the people, with the hatred of religious strife and with that attendant upon difference of race, and to confine the cupidity of demagogism, which blindly precipitates the whole popular power into war, in order to bring to its aid the greatest available strength.

"In so far, indeed, as we may possibly foresee, the greatest danger to peace in the near future appears not to lie in the possible desire of our armies and of the governments of our states to attack one another, but by far more in the revolutionary tendencies of those who, without cessation, preach civil war.

"As regards the situation of Germany, the basis for an extension of the peace societies is wanting, because everybody is of one mind in the condemnation of wars of conquest. Since the foundation of the new Empire, the love and regard for peace has grown with us quite as strongly as the resolution to be thoroughly prepared and fore-armed for an unfortunately ever possible defensive war.

"For this reason a fruitful discussion of the question of universal *disarmament* would only then be possible with us, when, beyond our borders, the clear comprehension should have been everywhere attained that Germany, according to its geographical position, is the country which is pre-eminently exposed to the offensive alliances of its adversaries, and to the plans of attack of the great military powers which on all parts surround us. Hence the conclusion would be deducible that the circumferentially situated states of Europe would have to precede in the matter of rules and stipulations tending towards a contemplated disarmament, before it would come to our turn.

"For my part, I am inclined to believe that the most pressing question, demanding to be made a subject for deliberation, would be this: whether there be the possibility of providing a sufficiently strong and lasting counterpoise to the deleterious exasperations and incitements to war which from time to time break forth before the outbreak of the war of 1870, the key-note of which was "*universal disarmament*,"—and the similar proposition of the deputy to

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from that portion of the press which, under the guise of patriotism, kindles animosities, awakens belligerent desires, and disastrously imperils those good intentions, favorable to the peace and general welfare of the peoples concerned, which may be harbored by the governments of states.

"As regards the proposed *courts of arbitration* for the settlement of international disputes, they are of exceedingly doubtful utility. But their importance must become comparatively subordinate, if not insignificant, when mighty disputes come in question, affecting the very existence and vital force of states. Governments really concerned in avoiding a war will readily and nearly always be able to find the means looking to a peaceable reconciliation of differences, without the necessity for seeking refuge in the organization of a court of arbitration.

"On the other hand, the belief that the establishment of courts of arbitration would render every war avoidable, might induce the serious error, consequent upon an overweening confidence in the efficacy of this remedy, which would cause the nations to cradle and rock themselves in a false sense and boast of security, while neglecting the earnest recourse to other and more serviceable means looking to the preservation of peace.

"The bombardment of Alexandria, perpetrated under the very eyes of an assembled peace conference by the power which had been regarded as the most peace-loving, furnishes an instance, proving upon what slim foundations depend the extravagant hopes, that every war may be avoided through courts of arbitration."

With not less satisfaction I further cite here the letter sent by Professor GEFFCKEN, in response to the *same* invitation, to the *same* address, dated from STRASBURG, in Alsace, 25 October, 1882. It is quite delightful to see with what resolution this learned and prominent man encounters the rubbish about "humanity," and takes the practical, realistic stand-point, which is principally contended for by, and almost exclusively abandoned to, the military profession. The letter, addressed to the chairman of the association, reads as follows:

"In consequence of my prolonged absence from Strasburg, I have not had the opportunity more promptly to answer the circular of the Peace and Arbitration Association, which you had the goodness to send to me. Notwithstanding, I wish to place it upon record that the letter addressed to the President of the Brussels conference by my colleague, Professor von Holtzendorff, meets my entire approbation. As gladly as I would mitigate the misfortune which war imposes upon mankind, I cannot bring myself to believe that the decree of an international court can furnish a practical means to do away with great conflicts, so long as vital international interests, irreconcilable with one another, shall exist. I certainly wish that the governments would resort, as seldom as may be, to the arbitrament of arms; but a court of arbitration would prove to be practicable only where the adverse contentions could be juridically formulated, and these cases are by far the least numerous and the least important. The greatest modern example of a court of arbitration, moreover,—that in the 'Alabama' question,—does not evidence that this is the appropriate medium for the settlement of international difficulties. This problem has not been solved either by the solemnity of form or proceeding of the Geneva tribunal, or by the importance of the interests at stake or the legal questions involved; emphatically, the judgment of this tribunal was possible for a single reason only, in that it depended upon a foregone conclusion, England having, the Reichstag, von Bühler, with which the latter addressed himself to various statesmen and governments, notoriously without securing any recognition worth speaking of,—and we have exhausted the category of the efforts heretofore set on foot *to do away altogether* with wars, or, at the least, *to make them less frequent!*

VII. In the mean time, recent efforts—taking their origin from the "unfortunately" *practically recognized inevitability* of wars—which tended to *humanize warfare in so far as possible*, were crowned with greater success. The best known of these manifestations, in the sense of the noblest and most enlightened philanthropy, became developed at the conference of delegates of a great number of European governments: the result of these deliberations is the "Geneva Convention" of 22nd August, 1864, which, from time to time, *received the concurrence of the governments of all civilized states.*

Up to that time humanity, wandering about unprotected and without legal status, had received only alms at the hands of war,—alms, liberal or meagre, according to the character or bent of the belligerents. In consequence of the Geneva convention, humanity has occupied a well-ordered, *legitimate* relation to war, and has been received into the household of war, but in the subordinate capacity of a handmaid. Even in this modest *rôle*, she has rendered service, entitling her to the greatest

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theretofore, in the treaty of Washington, agreed upon the application of certain doctrines prejudicial to her position, which made her condemnation inevitable. The significance of this salient fact cannot be affected by the fine speeches with which Count Sclopis inaugurated the proceeding, nor by those of Mr. Gladstone, who celebrated this example given to the world of how the brutal power of the sword might be replaced by a better means for the solution of international disputes. The present British premier has not hesitated to appeal to the argument of naval armaments and Remington rifles when the interests of England in Egypt were at stake, and I am also of opinion he was surely right, and have rejoiced in the victory of Tel-el-Kebir, because it saved that country from anarchy. . . . I deem it a duty to add that, had I been present at the Brussels conference I should have felt myself constrained earnestly to protest against the unseemly manner in which Mr. Tachard took the opportunity to resurrect what he saw fit, and to refer to the question of Alsace-Lorraine. We never proposed to take this province on the ground that its inhabitants wished to become Germans, but we took it because essential and indispensable to our security, in presenting an enduring obstacle to the periodical attacks of France, which have devastated Germany since the time of Louis XIV. Self-preservation is the highest law of the state. I must say that I was painfully astonished that not one of the German members present at Brussels, among them two members of the Reischstag, Mr. von Bühler and Mr. Lasker, thought it worth the trouble to enter his protest against the course of Mr. Tachard. . . ."

praise, in ameliorating the miseries of war, and is destined in the future to gain well-deserved laurels.

VIII. But, as things go, the handmaid, warm in the household, wished to be joined in governing,—aye, wished to *govern alone!* No wonder she was relegated by the master, according to contract, to her subordinate position!

The efforts and tendencies of humanity, *since the conclusion* of the Geneva convention, have no longer respected the above-specified bounds, before which, in deference to the rights of war, they must cry a halt.

To the warm-hearted *philanthropists*, more and more *jurisprudents* have allied themselves:—under the banner of humanity, they vie with one another in endeavoring to penetrate into the domain of war, to shackle it in paragraphs and to "humanize" it in obedience to their precepts.

IX. We will refer to *three* instances of this *trespass beyond determined limits.*

First.—As a death-blow to the progressive views of many conservatives, especially in the ranks of lawyers and publicists, and, no doubt at the same time, as an intellectual basis for the supervening efforts of others, there appeared in the year 1872 the first, and in 1874 the second, edition of a book of Professor Bluntschli, entitled "Modern Right of War of Civilized States."

"This book is intended," thus we read in the preface, "to contribute to the mitigation by right[6] of the unavoidable evils of war."—There we have it: the handmaid, instead of being tolerated, shall govern; she shall have a *right* to prescribe dictates to war!

Secondly.—Through the *personal* initiative of the then reigning *tsar of Russia*, an international conference assembled at Brussels in 1874, with a view to a comprehensive codification of the laws of war.

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[6] The word will be understood here, as above and elsewhere, to be used rather in a technically legal than in an ordinary sense, and appears of more comprehensive scope than the term "law," which, whether written or unwritten, would naturally be interpreted among English-speaking people as indicative of something established and definitive, in contradistinction to the theoretical disquisitions of a writer advancing his opinions as to what the law should be. It is true that in those branches of the science comprehending the domain of international law and the "*jus belli*," the writings of eminent publicists are received with peculiar force; but, on the other hand, the principles advanced in that offshoot, if we may so call it, of these branches, which would transgress heretofore well-accepted bounds, cannot for the time being be regarded (while we may respect the humane and well-intentioned motives of their advocates) as other than problematical and speculative.—TRANSLATOR.

The event, the "*Brussels declaration,*" was purely negative; drawn up by the delegates of all the participating powers, it should and could have served to pave the way to further conferences and an eventual understanding between the governments; but no such result ensued. It *could not* ensue, because again it was sought to impose upon war doctrinary fetters, which could only be derisively shaken off.

Thirdly.—The international peace society "*l'institut du droit international*" published in 1880 a hand-book, "Rules for War on Land," which for the same reason will meet the like fate of being ignored by those in authority. In consequence of the transmittal by Professor Bluntschli of this "hand-book," His Excellency von Moltke, as before related, wrote the letter in which he so succinctly and clearly presents the matter and defends his position from a strictly military stand-point, and in which he so emphatically exposes and condemns the fruitlessness of those purely theoretical legal shackles, which would seek to trammel belligerent action.

"Military necessity must peremptorily and utterly disregard a right of war, based upon ostensibly legal doctrines, which find no place in the domain in which that *military necessity* ordains laws and raises *its* authoritative voice,—in the domain of power and of passion."[7]

ad VII. That the Geneva convention of 1864, while in no wise free from deficiencies, has yet encountered a universal recognition of its provisions, and has conferred so many blessings, is clearly attributable to that *wise limitation*, by which it remains aloof from the appropriate sphere of military action. Its chief aim is, without intermeddling in the affairs of war or battle, to care for the victims: the sick and wounded warriors are, without regard to sides, to be taken up and cared for by the ambulances and hospitals of all nations; the sanitary *personnel* and *matériel* are neutral.

All these provisions of the convention are practicable, they do not interfere with military movements and operations,—and *for these reasons, as a matter of fact, they have been respected.*

On the other hand, serious reflection must be induced by those provisions, in consequence of which those who have *convalesced* are to be entitled to especial consideration; by which a certain independence of *military* rules and regulations is conferred upon the *surgical personnel,* and by which, finally, a *non-military personnel*—under the sign of the red cross—is placed under the protection of the convention.

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[7] "Critical Essays by I. von Hartmann, General of Cavalry z. D. II. Military Necessity and Humanity. Berlin, 1878,"—a highly interesting and important contribution to the subject of our article, treated in form and contents in that liberal, animated, and thorough manner peculiar to the general, who has gone from among us, all too soon!

To the actual convention, a *supplement* was ordained on the 20 October, 1868, whose articles are in general recognized as binding. The *supplementary article* 5 decrees: "that the wounded who have fallen into the hands of the enemy, even when *admittedly not incapacitated for further service* (*!*), *must* (*!*), after ultimate recovery, or, *where possible, sooner,* be sent back to their homes, subject to the condition, nevertheless, that during the continuance of the war, they shall not again bear arms."

Whoever reaches home well, is individually again in duty bound to serve; in the excitement attendant upon animosity and passion there can be no tangible way of guaranteeing inviolate observance of such engagements towards an enemy, or the *non-observance* and *restriction* of that *other duty* towards the *state.* But supposing there were: every well, aye, in many functions, even invalided soldier, who has been a prisoner of war, *replaces at home and relieves,* another, who is rendered *available* for service as an active combatant.

As a matter of course, this provision was not followed by either side in the war of 70/71; otherwise we Germans would indeed have fared badly.

And as little have we been able and have we desired to pay full respect to that one of the Geneva stipulations in paragraph 5, which reads: "Every wounded man received and cared for in a house shall serve as a protection to it. On no one who receives the wounded, shall troops be billeted, nor shall such be subject to levy for war contributions, except in so far as may be unavoidable."

This provision was attended with great abuse in 70/71, and greater abuse was attempted. Every one who took part in the war against France will confirm this. *Only* considerations having in view the protection and quietude of sick and wounded *warriors,* can militate against the occupation of a position for troops unsheltered and in need of rest, —*never* considerations having regard solely to the convenience of the inhabitants. Such humanity in behalf of the owners of quarters would be insane and barbarous cruelty towards the soldier under his fostering protection and care, which, when exercised by a commander, should subject him to well-merited and condign punishment.

Paragraph 5, therefore, would have to be absolutely stricken out of the convention. And thus, finally, the "*volunteer care of the sick,*" with its professional—unfortunately, also, often unprofessional—*personnel,* "wandering and intermeddling about the field of battle," cannot be allowed to occupy the *exalted* position proposed for it by the Geneva convention. It must, moreover, be imperatively insisted upon that "every institution of humanity must attach itself to the conduct of the war; every instrument working in the service of humanity must *subordinate* itself to the demands of warfare." [8]

The prediction of many that not all the provisions of the Geneva convention could be practically observed in a great war, has been verified through the campaign of 70/71. As urgently, therefore, as a change in the convention, in a number of points, is necessary, as vividly would it be a matter of regret, in the interest of humanity, if the faultiness of *single* stipulations should bring it about that all, even those which are positively good, and, as a rule, practicable, should be ignored by the belligerent parties.—

Unfortunately, not a few of the attempts at observance, made in consequence of and in obedience to the action of the convention, are not calculated to serve the good cause.

(ad IX. first.) Let us turn to Bluntschli.

He judges as follows (p. 39): "The conclusions of the Geneva convention must suffer from the fact that the science of international and public law was unrepresented at their determination. Medical and military knowledge do not suffice in ascertaining proper expression for *legal enactments*."(*!*)

With *the latter*, the subject has nothing to do, as will appear further on. But let us glance at the "legal enactments" in *his* "hand-book," and we will find that many of them mutually restrict or totally enervate one another; that the majority of them, through supplementary clauses, such as:—"in so far as the aims of the war permit;"—"when possible;"—"if necessity demand" (and of such, many), derive an india-rubber-like quality of extensiveness, which robs them of every value and of all claim to render *warfare* subservient to them.

A few examples, with succinct explanation, may find place here.

Paragraph 46 of Bluntschli reads: Section 1. "Correct custom of war demands that the besieger, when it appears practicable,(!) shall, before the bombardment of a place, give notice of his intention, in order that non-combatants, especially women and children, may be removed or otherwise rendered secure."—Section 2. "A surprise may, however, be *necessary*, in connection with a bombardment of a place, to insure its prompt(!) capture, and then the omission of every notification is justified."

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[8] Lueder.

Rüstow sharply and summarily comments upon this paragraph in this manner: "It is self-evident that the first section becomes determined and inoperative in itself through the conditional clause, "when it appears practicable," as to which naturally but one man, the commander of the besieging corps, can decide,—and that the second section then absolutely renders the whole of the first section void and of no effect. Fortifications are built for defense; it is no affair of the besieger to contribute anything in any shape tending to increase their strength or power to withstand attack. But that very thing he would do, if he gave notice of a bombardment a considerable time in advance, with a view to enable the besieged, at leisure, to make every preparation to weaken its effect."

Bluntschli reflects upon the "leave given to fleeing women and children to depart from the besieged city of Strasburg" as an "example of noble humanity." And who will not concur with him in this?! But it becomes necessary, says General von Hartmann, to add to the praise of the learned authority on public law, a brief military commentary. The leave to depart, referred to, was granted as a result of Swiss intervention in the middle of September; an application of the commandant of Strasburg, who asked a similar favor as early as the 21st August, had been unfavorably received. The answer then made by General von Werder, contained the following: "The fortifications of great cities have their weakness in the sufferings of the inhabitants . . . The leave to depart, asked by you for a portion of the inhabitants, would therefore increase the strength of the fortifications." Such was the conclusion before the opening of the bombardment; when, in September, the regular siege had made marked progress, when the event was looked forward to with the most absolute certainty, when the moment of crowning success had become susceptible to mathematical calculation and determinable to the day and hour, that could be granted which before had been refused. Thus does military necessity present itself in varying aspects. From Belfort a similar communication was sent to the commander of the besieging troops, which met with absolute refusal. The assailants had to battle with almost insuperable difficulties, and dared not to hesitate to take advantage of every existing weakness of the adversary.

Something more from Rüstow:

"The victor is to judge in an occupied territory, through *military courts* or *military commissions*, over what are denominated by the publicists as violations of the rights of war. These are, however, nothing else and can be nothing else than every one and all of those acts of the inhabitants, which work injury to the victor and are therefore *disagreeable* to him,—acts which by the other side are declared to be in the highest degree entitled to fame and praise. Now, can a military tribunal of the victor judge impartially over such violations of the rights of war? No! It cannot, in fact, *judge* at all, for a 'code' upon 'violations of the rights of war' is a simple impossibility. Such a tribunal, as it cannot judge, is also powerless to inflict *punishment.* It can do no more than seek to *reprimand* and *prevent,* through the instrumentalities of force and the engendering of fear, acts which cannot be tolerated by its side, without laboring to contribute to its own subjugation. Let it be well understood that such a tribunal is *powerless to enact in any other spirit,* were it even to be composed of the wisest, justest, and mildest men in the world."

Such being the actual state of affairs, let us now turn in this connection to Bluntschli's paragraph 40: "And these tribunals are not to proceed at will and pleasure or to be actuated by animosity,(!) but are in duty bound to observe the fundamental laws (!) of justice. They are especially enjoined to allow the accused full and free defense, to employ no coërcion, if even summarily, yet impartially (!) to investigate and receive testimony as to the subject-matter, and to impose upon the guilty only a relatively (!) severe punishment. *But* they are not to be bound by the more strenuous precepts of ordinary legal proceedings."

There is a world of contradiction in *these* sentences of the "handbook of the right of war,"—as in most of the others! They appear sickly, in the fragile bloodlessness of "senile theory"! They overdo each other in seeking to bind and handcuff, not alone the *strategical conduct of war,* but even all *tactical execution!*

At one time, the right of war proposes to go so far as to obviate even the necessity for characterizing the enemy as such, or for legalizing the means to be employed against him; at another the simultaneousness of the declaration and of the commencement of the war, without a preceding unequivocal threat of resorting to it, is declared to be an outrage against the interests of humanity. Again it endeavors to interpose barriers to prevent dissimulation and surprise, and would accomplish the confinement of all legitimate operations against an enemy by limiting them to the sole untrammeled employment of the entire force of arms by pitched battle. Open undefended cities are not at all to be subjected to fire, and of fortified places, the arrangements for defense alone! And lastly, it draws the narrowest limits with regard to the use of the various means and the *matériel* of war, which may become available in an enemy's country. Public right, as a science, does not take its starting-point within the domain of war. The universal right of mankind and peculiarly the right of states and private rights, give to its developments color and tendency. It rests upon premises, in part *ideal*, in part absolutely *hostile*, and in consequence can receive no consideration *in war*, which represents *realism* in its most terrible aspect, that trial of right by force in its most frightful exemplification.

Bluntschli says, "The war power may do all that which military necessity demands; that is to say, *in so far as* its measures appear necessary, in order to reach the objects of the war with the means of war, *and* (!) in so far as they are consistent with universal right and the usages of war among civilized nations."

Verily, a regular india-rubber paragraph—a provision with many meanings! "Measures which appear necessary;" "objects of war;" "means of war;" "usages of war among civilized nations"—these phrases, every one of them, are unqualifiedly to be received only as relative, not as fixed and determinate potentialities.—"The solitary absolutely definitive thought, not liable to fluctuation, that is conveyed, is with regard to 'universal right,' and it is just as to this that belligerent action in the comprehensive employment of power and force places itself in the most diametrical opposition." Thus General von Hartmann.

(ad IX. thirdly.) With this judgment and condemnation of the "right of war" of Bluntschli from a practical military stand-point, we must include a verdict upon the "hand-book" of the "*institut du droit international*," which is allied to that of Professor Bluntschli in the closest manner and precisely similar to it in its essential, characteristic phases.

(ad IX. secondly.) There remains, briefly to be disposed of, the third of the so-called trespasses beyond limits:—*the Brussels declaration.*

This contains a number of determinations as to the humane treatment of *prisoners*,—determinations well adapted as starting-points for the conclusions of a convention after the manner of that negotiated at Geneva. For what applies to the peculiar *protégés* of the latter, viz., the sick and wounded, applies also to prisoners; their existence is *in the rear of*, to great extent independent of, belligerent action, which they cannot in significant measure affect. But the Brussels declaration, instead of being satisfied with the enunciation of principles, prescribes the most detailed directions as to the treatment of prisoners; the form of these directions is such as to afford play for the most latitudinarian interpretation,—and thus the declaration cannot count upon governmental recognition.

What, for instance, could evidence greater philanthropic aberration, greater violence to and greater ignorance of the actual life and essence of war, than the following: that an escaped prisoner, when recaptured *as such,* shall be subjected only to merely disciplinary punishment or a stronger or more scrutinous guard; but when,—after he shall have succeeded in his *flight* the first time,—he shall be made *anew* a prisoner, engaged in the ranks as a *combatant,* he shall suffer *no* punishment whatever!

Article XXX. provides, in regard to the relations of the military power towards civilians: "The lives and property of individuals must be spared."

A vapid phrase! For, according to the objection of General von Hartmann: "every ordinary march which leaves the *chaussées* and military roads, every bivouac whose location is selected without reference to improvements or cultivation, every disposition of troops demanding intrenchments, or the arrangement of obstacles, necessarily makes deep inroads upon the property of individuals; how can one, in fact, dream of such a thing as to formulate such a paragraph when military movements, at every step, in every manœuvre, quite independently even of the great moments of battle, imperatively demand that it be laughed to scorn!"

X. Underlying the deliberations of the Brussels conference was a proposition advanced by *Russia,* whose basis, like unto that of the theses of Bluntschli and of the hand-book of 1880, is incurably deprived of all strength through the doctrinary error that it is thought possible to relieve from home service the absolutely entire organized armed force of a state, and to antagonize it, in the wager of battle, to the similarly relieved and equally entire organized and armed force of another. Here we observe a want of appreciation of the fact that the "organized armed force" cannot allow itself to be thus relieved in the *modern* state, for the simple and undeniable reason that it consists of the "people in arms" and that, in consequence of the universal duty to bear arms, the wars of modern times must of necessity become *wars of the people.* And equally nugatory, just as the corresponding determinations of Bluntschli, and of the international hand-book, is the fundamental section of the—Russian (!)—"St. Petersburgh" propositions, which reads: "Military operations must be *exclusively* directed against the *combatant force* and *instrumentalities* employed by the inimical state and *not against the citizens and people owing it allegiance*, unless in the event that the latter shall individually take part in the conflict."

In radical opposition our Field Marshal Count von Moltke declares in his letter:

"The greatest benefit attendant or consequent upon war, is the rapid termination of it, and to that end every available means,—not necessarily including those entitled to deprecation,—must be allowed to stand at our service. In no sense can I admit concurrence with the sentiment of the '*déclaration de St. Pétersbourgh*,' that the 'weakening of the hostile combatant power,' is the solitary proceeding justified in war. *No, all the sources of aid to the hostile government must be assailed;—their finances, railways, means of sustenance, even their prestige! With this energy*, and at the same time with greater moderation than ever before, was the last war against France conducted. In two months the campaign was decided, and only when a revolutionary government continued it to the ruin of the country for four months longer, did the engagements assume a bitter character."—

From the commencement of our century, from Napoleon I., are to be, in point of fact, dated the art of great wars, of decisive strokes, of thrusts to the heart. The adversaries of the emperor learned from him. General von Clausewitz, the most eminent military writer of recent times, has thought out the system of the great modern war, in its relations to policy. He says "*upon the character of the wars of the present day*:"[9]

"The consideration due to the character of the wars of the present day has a great influence upon all, especially strategic dispositions. Since the time when all the formerly accustomed means have become utterly obsolete through Bonaparte's great fortune and shrewdness, and states of the first rank have been annihilated almost at a single blow; since the Spaniards, through their well-sustained resistance, have shown what, in spite of their individual weakness and porosity, can be accomplished by national armaments and the employment of insurrectionary instrumentalities on a grand scale; since Russia, by the campaign of 1812, has taught us, first, that an empire of vast dimensions is not to be made subject to absolute conquest, secondly, that the probabilities of final results cannot invariably be gauged in proportion to the loss of battles, capitals, and provinces that may be sustained, but on the contrary that one is often strongest in the heart of one's own country, when the offensive power of the adversary has exhausted itself, and when the defensive is enabled to transform itself with terrific force into the most aggressive offensive; since, moreover, Prussia has proved to us, in 1813, that by a violent effort, the ordinary strength of an army may be augmented sixfold in the way of militia, and that this militia is equally available abroad as at home;—after all these instances have demonstrated what a tremendous factor in the product of the national power, the war power and the combatant power, are the heart and sentiment of a nation;—after the governments have learned to recognize the importance of all these means of aid,—it is not to be expected that they will hesitate to make use of them in future wars, be it that they are threatened with danger to their very existence, or be it that they are animated by a mighty ambition. *That wars, waged on each side with the entire strength of the national power, must be conducted upon other principles than those, where everything was calculated upon considerations appertaining solely to the standing armies to be opposed to one another, is easily to be perceived.*"

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[9] Vom Kriege (Of War), Part I., Book 3, chap. xvii.

Upon the basis of the views and doctrines of Clausewitz, which have hitherto met with no refutation in theory, and in practice have only found renewed confirmation,—upon the fundamental principles and doctrines of Clausewitz,—depend, and from them are deduced, at the present time, in the German army, and no doubt in all armies deserving mention, excepting the Turkish, the views as to the objects, means, and conduct of war.

And let us look at *theoretically* humane Russia, in actual *practice*, in the last Oriental war, a national war in its most frightful aspect. "To the Russian war manifestoes and proclamations, to the words of its bishops, with which the banners of the troops were blessed, to the measures which brought about the Bulgarian insurrection, are to be attributed the peculiar characteristics impressed upon the Oriental war. Russia proclaimed the war of race and religion, and upon those who then held political sway in her, must fall the terrible responsibility of having given impulse to the disgraceful atrocities and massacres in Bulgaria and Armenia."[10]

And the Russian *mode of warfare?* With the last breath of man and steed did they force the passage of the Balkans, and successfully accomplish the advance to within sight of Constantinople, and the tremendous assaults upon Plevna were inspired by a leader,—certainly in sympathy with us German officers,—in contemplation of and in contradistinction to whose energy, the St. Petersburgh propositions at the Brussels conference must veritably appear to us as naked irony.[11]

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[10] General v. Hartmann.

This sickly sentimentality of our time, which becomes continually more and more aggressive, this unripe, vapid delirium on the subject of humanity, really destitute of true decency, now claims an absolute proof of the tenableness of its ravings in the fact, for which it alone is to blame, that our Field Marshal, in spite of his letter, has been strenuously attacked almost at all hands—the military, of course, excepted—and depicted as of cruel, uncivilized mien!

Fortunately the superior and inferior leaders of the German army will not be inclined to proceed in war with less decision, or more slowly, more tenderly, more considerately; they will continue to feel the consciousness, as it is their sworn duty, as the welfare of their own people and of the fatherland enjoins, that on a grand scale as well as small, at every opportunity, they deal out recklessly mighty blows, and that they shun not relentlessly to offer up on the altar of military necessity the greatest sacrifices, when the most important and rapid results may be thereby attained, and the war thus be brought to a prompt termination. Were they to act otherwise, their conduct would in truth be *inhuman!*

They are manly, clear, apposite views, worthy of the widest dissemination, which Professor Lueder develops on this subject:

"The field of battle is covered with countless numbers of the horribly wounded and maimed of both armies, frightfully crying for help. What can there be to do greater violence to every humane emotion, what more heartrending, what more unbearable even in thought to every feeling person, than the idea that these terribly suffering ones, instead of receiving the promptest, most solicitous care, must be subjected to greater torture, to mutilation, to destruction? And yet! The object of the battle being contended for, and to bring about the accomplishment of which all these great sacrifices have been made,—the deciding of the day,—demands a charge,—an advance in mass,—of the cavalry, of the batteries. The advancing ranks storm over the fainting and the groaning, treading down and stamping upon everything in the path of their progress. Can anything more distressing be imagined? And yet,—he would be not only a bad commanding officer, he who, even upon *such* considerations as these, would allow deflections, delays, and the disastrous neglect of the determined instant of the storming advance, but he would be also and simply a traitor to his country, violating his sacred duty. Nor would *he* stand upon the ground of *true* humanity."

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[11] Not the strategical disposition, but the tactical execution, has our sympathy, as also the decisive spirit of the offensive, the intrepid determination to subjugate the adversary!

From a recent essay by Lieutenant-Colonel von BOGUSLAWSKI, I extract the following:

"If any one should believe that unsound doctrines and a false philosophy can have no influence upon the mode of action of a well-schooled corps of officers, I would point to the events of 1806, after the battle of Jena. It was shown that the philanthropic views which then largely made themselves felt in the education and inclinations of the cultured, had in many cases turned the heads even of officers in high rank, and, superadded to the exaggerated notions of the Napoleonic power, notably contributed to that pusillanimous attitude, evidenced especially by the surrender of many of our fortified places."

For such and other reasons we cannot and will not be in accord with the demand of Professor Bluntschli, which reads: "*It is imperatively necessary* that the laws of nations, and particularly the rights of war and rights of neutrals, be taught with greater care than heretofore, in our *military schools*."

Briefly characterized and illustrated to the *leaders*, they must be, it is true,—but totally kept back from *subordinates* and the *rank-and-file;* in contradiction to the doctrines of the "rights of war," our officers as well as our soldiers are to be educated to act with the most complete energy, in war!

Thus, the interests of *true* humanity will be best promoted!

XII. In so far as the nature and aims of the war admit of it, in so far may, in so far also *must* the efforts and tendencies of humanity be allowed to have full scope. They are, indeed, almost entirely excluded from acts immediately pertaining to armed conflict and remanded to *side domains*, but there much room is afforded them for the development of rich blessings.

a. Governmentally, in accordance with the spirit of the Geneva convention (which, as before remarked, should be revised), stipulations might well be agreed upon as to the treatment of prisoners, determination of the identity of those who have fallen, protection of the wounded, disinfection of battle-fields, etc. Such arrangements, kept within bounds, would be decidedly *useful*. But we should beware lest we grant them *undue consideration*, or *exaggerate* their importance and force at *those* *moments* when the passions are let loose. "The brain may devise laws for the blood; but a hot temper leaps o'er a cold decree."[12]

b. A *better* security for humane warfare is to be found in the *leaders* of higher and lower grade. As no officer of our army will ever give way, it may be hoped, to a false philanthropy, so will he certainly not be guilty of or allow actions which are *only cruel*, without serving belligerent aims and uses, and which are, in consequence, not made legitimate through military necessity.

c. Through the maintenance of the strictest *discipline*, through *conscientious care* for the *subsistence*, *clothing*, and *proper wants* of their men, the leaders do not serve their own army alone; they also advance the interests of humanity.

d. Our *military laws* threaten with severe punishment the *derelictions* of *individuals* in the field:—plundering, making of booty, marauding, the intentional or ruthless alienation, damage, or destruction of the effects of others. It is the *duty* of the *leaders* to acquaint their subordinates with these laws,[13] and to insist upon the strict observance of them; and it is also the duty of the *leaders*, whenever the necessity may arise, by precept and example to restrain the inflamed passions of their subordinates from acts of barbarity and inhumanity. But, as a matter of course, the leaders cannot be *omnipresent*—and *they*, also, moreover, are men of flesh, and blood, and passion,—and thus it happens that even *these*, in themselves valuable safeguards to humanity, do not always suffice—in fact, become *totally* insufficient—in the moment of intense excitement. What Thucydides said, many centuries ago, in his "History of the Peloponnesian War," well applies: "In brief, whoever believes in his ability, through the force of laws or any other means of terror, to interpose obstacles to man, when his *innate nature* impels him to an act, believes what is impossible, and manifests egregious simplicity."

e. The difference between the *humane* conduct, say of the wars of 66 and 70, and the barbarity of the Thirty Years' War, forcibly presents itself to us. The difference has not been wrought by the conventions, nor the leaders, nor the discipline, nor the articles of war of modern times, but has been *naturally* accomplished. *It is due to the influence of Christianity that the enlightened culture of the nations has grown and progressed!*

The *individual* soldier, representing and executing military necessity, must *at the same time* represent and manifest *humanity;* the more refined a people may be, taken all in all, the more humanely does it wage war. There lies the fundamental impelling power; not in the legal systems of the professors or the peace sermons of the apostles of humanity, but in the moral and enlightened culture of the nations! Upon *this* soil *alone* grows up "*that power of refinement*, which, even in the midst of the greatest strains of conflict, draws a moral *cordon* around the unprotected and unarmed, and would save them from becoming directly involved in armed strife; which restrains the hand that would invade the luxuries of the adversary, even when that which he has hoarded together in ample measure appears to be deserted and consecrated to destruction; which compels the self-denying soldier only to satisfy his torturing hunger subject to a constant regard to the rights to be accorded the enemy,—*that power of refinement* which in *such* fashion justifies and enjoins the *highest* and *most sublime* exemplifications of self-forgetfulness."—And such is *actual*, perfect humanity!

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[12] "Merchant of Venice," act i., scene ii.

[13] To these are to be added the unequivocally valid and binding provisions of the Geneva convention.

The poetry of the sailor's life is the storm, not the haven; of the soldier's life, the field of battle, not the monotonous garrison! To whom of us had not come often, the thought of war in the future?

XIII. We must not, in conclusion, omit to consider the question: "What place and part will be assigned to humanity in the next war which Germany shall have to wage, be it at an early day, be it in ten or twenty years?"

The answer, to be entitled to consideration, must be based upon the assumption of a determined political situation:—with whom shall we be allied, to whom shall we be opposed?

If, in the elaboration of the subject, I have heretofore been enabled closely to lean upon authorities such as Hartmann and Rüstow, I am compelled, now that I propose, in connection with my theme, to sketch in general outline the picture of our war of the future, to abandon solid ground and tread the intricate labyrinth of prophecy. When, in doing so, I deliver myself, hand-bound, to the judgment of my readers, I am encouraged by the reflection: "We all err, but each of us in different fashion."[14]

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[14] In thorough accord with the writer, the editor of the *Jahrbücher*, for reasons which need not be here given, has abstained from a publication of this description of the war of the future, accompanied as it is by remarks upon our political relations, our military organization, and other pertinent subjects.

Yet, sure of the approval of our German comrades, we could not refrain from giving space to the concluding sentences, containing the quintessence of the entire article. May they find fulfilment, God grant!

I cease! It appears satisfactorily evident to me that the prospects for humanity in the next war are slim indeed!

From the stand-point of *common brotherhood*, we may regret that in all probability a step backward in civilization is likely to ensue. The *soldier* thinks coolly upon the matter.

Let us keep the aim in view! Upon the subject of our *next* war, our descendants *must* read in history the *summary* judgment: "*The German people gained the victory, thanks to their reckless warfare, annihilating, exterminating, subjugating everything in their way!*"

Not necessary, but of *especial value* would it be if, after this sentence, an asterisk should point to the note:

"What once Field Marshal Count von Moltke said, as to the war of 1870/71, applies in every respect to the last war, namely: that with every energy it was more humane, and conducted with greater moderation, than ever one before!"

Fig. 1.

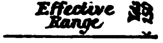


Fig. 2.

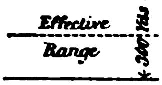


Fig. 3.

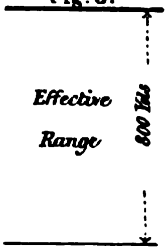


Fig. 4.

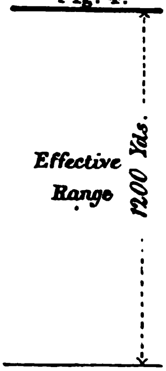


Fig. 5.

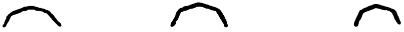


Fig. 6.

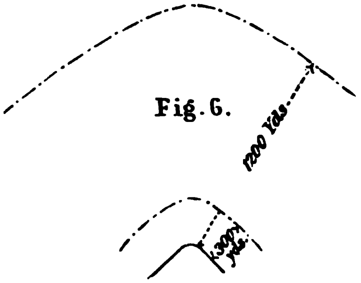


Fig 7.

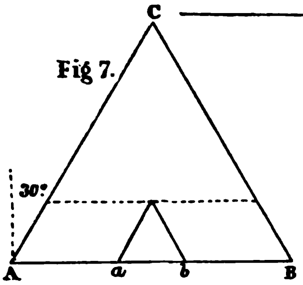
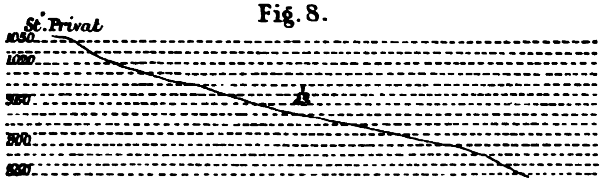


Fig. 8.



Section of ground up which Prussian Guards advanced at Gravelotte.

Fig. 9.

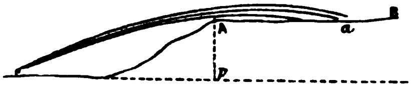


Fig 10.

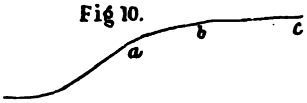
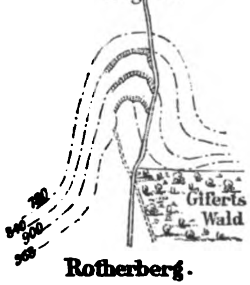


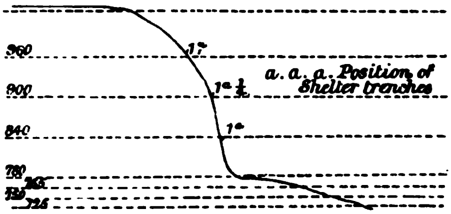
Fig. 11.

Fig. 12.



Rotherberg.

Fig. 13.



Section of the Rotherberg, Battle of Spicheren.

ON SOME CHANGES IN TACTICS CAUSED BY THE INCREASING POWER OF MODERN FIRE.[1]

BY CAPTAIN W. H. JAMES, P.S.C., LATE R.E.

TACTICS may be defined as that portion of the art of war which is based on the proper employment of troops, taking into consideration the weapons with which they are armed.

The history of war shows us that since the first introduction of firearms there has been a gradual tendency to replace shock by fire. Efforts have been made—but vain efforts—not to admit this, and keep back troops to the old belief in the *arme blanche*, but the logic of facts has been too much for the advocates of the old system, and it is now universally admitted that it is fire as represented by the modern rifle which decides battles. But time is required before old views are altered by modern fact. I have been much struck from time to time in wandering over some of the battle-fields of the Franco-German war to see how much they have obtained to the detriment of troops bound by them, and I propose to bring forward this afternoon a few points which I trust you will find worthy of your consideration.

It has often been said that victory depends rather on the number of the enemy frightened than on the number killed. No doubt this is somewhat the case, but the frightening itself depends on the number of casualties. Let us suppose that to inflict the loss necessary to produce defeat in a given force fifty thousand bullets be required; these will require a certain time to fire off, and the available time will depend—

1. On the rapidity of the arms.
2. The range over which they are effective.

Referring to the diagram, Fig. 1 represents the state of affairs in the days of the great Frederick. Rigid lines and no skirmishers. Fig. 2 shows the advantage gained under the Napoleonic system of supplementing the fire of the line by skirmishers. We see from a comparison of these two figures that the effect of employment of skirmishers is practically to considerably enlarge the distance over which an enemy would suffer from infantry fire, or, in other words, to have the same effect as increasing the range of the weapons. Fig. 3 shows the enlarged dangerous zone due to the introduction of rifle-fire, *i.e.*, the time of 1854–66; while Fig. 4 shows the present state of things with the modern small-bore rifle.

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[1] Read before the Royal United Service Institution.

Now, it is plain that all these improvements which increased the results obtained by fire, while those from shock remained unaffected, tended, and that very additional improvement still tends, to augment the proportion of effect due to fire to that due by shock. We know that nowadays troops are driven from positions by fire alone, whereas in former times actual collision or shock was needed. This continual change in the relative value of the two parts of the infantry armament has involved in its turn changes in formation and in the method of occupying ground. Frederick the Great fought his battles whenever possible on open ground, to which alone his rigid formations were adapted. Over ground other than even, his processional movements were difficult and dangerous, as witness the battle of Künersdorf, 12th August, 1759. The early wars with the French republic showed, too, how in such ground as the fighting then took place in the rigid line formation was liable to disaster. We see it therefore replaced by the flexible column and skirmisher formation, and later the Duke of Wellington introduced the still more flexible battalion line covered with skirmishers.

Up to the end of this epoch, however, fire was merely looked upon as preparatory for the shock, and the tactical formations employed were all designed with a view to the ultimate use of the latter. But with the introduction of rifles—and still more of breech-loading rifles—it was soon acknowledged that the days of shock were over, and that fire reigned supreme.

The formation for shock has therefore disappeared, and the object now of all infantry formations, whether on the offensive or defensive, is to maintain a shooting-line at its proper strength. This has involved a very important modification in infantry fighting arrangements.

So long as their object was to bring up a formed body to use the bayonet, so long were drill-formations used on the battle-field. The men moved forward under the direction—*i.e.*, command—of one man, whether the body in question was a battalion, column, or line, or even the huge columns employed by Napoleon in his later wars, and the consequence was that the number of individual actions was limited to the number of attacked points. The issue of the fight then depended on a comparatively few commanders. But now the whole circumstances are changed. Modern fire has dissolved the close formations, and the advance now consists of a number of small units, led each by an officer, guided by one general idea, but not moving as a coherent whole in the same sense as the closed masses did in former days.

As a consequence, we find a certain tendency to return to the style of fighting which characterized the wars of chivalry,—a number of combats directed to one common end, but differing very distinctly from the manœuvre battles of Frederick or of Napoleon.

Whether an army be attacking or defending a given position, it is evident that there are places round which the fight will centre, where the struggle will be severe, and others where the fighting will be of a much more tentative character, and this tentative character will be general along the whole line of battle until the object of either side is clearly visible. This is one of the most strongly-marked features of modern fighting. Lines of battle are drawn up at such long distances from one another, and long-range weapons have so prevented close reconnoitring, that it is not until the action has been begun that it is possible to distinguish the points where the attack must be pressed home. This argument does not apply to strategically direct manœuvres, such as the outflanking movement of the Guards and Saxons at Gravelotte, but it is well exemplified by the misjudgment of the extent of the French right at the same battle,—an error for which the Germans paid dearly in the losses inflicted on the artillery of the Ninth Corps.

In the future, then, we may expect battles to be entered on much more cautiously. An endeavor will be made by the offensive to ascertain the disposition of the defensive, first of all by cavalry reconnoissance, secondly by artillery fire. But as that will be compelled by modern infantry fire to keep at a respectful distance, say two thousand five hundred yards, or one and one-half miles, at the beginning of a fight, its effect will scarcely reveal the detailed arrangements of the defense, more especially as the defenders will usually be in shelter-trenches and behind cover, which will conceal their position. A tentative or reconnoitring infantry attack, therefore, becomes necessary, after the preliminary artillery duel has sufficiently progressed as to render an infantry advance possible.

Now, how shall such a tentative advance be carried out? By the modern attack formation? But it seems to me worthy of inquiry how far existing formations are suited to such an advance. Plainly, we must attack more or less along the whole line, and if we have an army which may form a line of battle several miles in length, it would appear difficult to expect an infantry advance to take place under the present ideas of attack formations over such an extended length of country. We know that at the Alma, with troops in close order, and therefore better in hand, that confusion arose; much more would it then with the men in open order. The difficulty which has chiefly to be met with is the fact that troops do not keep their initial direction, but, turned aside by ground or by fire, overlap one another or leave gaps, and that the consequence is a mixing of units, which, even if unavoidable, is nevertheless to be deprecated and put off as long as may be. Where, therefore, the fight is hottest, at the points, that is to say, towards which troops will be most directed, there will the mixing and confusion be the worst. It is, however, precisely at these points that order is of the greatest necessity. I would suggest, as a possible solution of this difficulty, that instead of extending the two companies of a battalion as at present, evenly along the front, they should be divided up into sections in single rank, but kept together or with but very slight distances between the files (see Fig. 11). These groups or fighting units would be better kept in hand by the intervals between them. The men would naturally tend to close on themselves as gaps occurred in the advance, and when it was desired to strengthen any particular part for an attack the supports and reserves would be easily brought into the intervals between them. By some such plan as this a commander could settle whether the fight should be tentative or be pressed home; but once the men are in extended order experience shows that all hold is lost. At the points, however, where the attack is to be pushed home, a series of battalions will often have to be thrown one on the other, and these will all tend to converge on the key of the position, and thus produce disorder. It is, therefore, necessary to support the front line of troops by others to hold the positions when won. How shall these be brought up? It seems to me in battalion line, provided intervals are kept between the companies. For experience shows that if the attention of the enemy be riveted by a sufficiently powerful shooting-line, formed bodies can move behind it with comparatively little loss.

With a view also to keeping the men in hand during an advance, which is much more difficult than when a force is stationary, I also venture to suggest that independent firing should be abolished. Troops will at close ranges use it, and no power can stop them; but allowing no one to fire without permission, *i.e.*, using volleys, would certainly tend to put off the evil moment as long as possible.

On the defensive a similar plan to that shadowed forth above might be adopted. During the preliminary stage the position should only be marked, as it were. During the first part of the infantry attack the groups, as suggested, would form the firing-line, and only when the enemy's infantry got within about half a mile should the supports be extended.

I think here is a point worthy of notice, viz., that on the defensive, supports to a shooting-line, whenever possible, should, during the close infantry attack at any rate, be close up to the line they are to support; probably in deep shelter-trenches within fifty or sixty yards. It is difficult to get men to cross a shot-swept space if it be not within the limits of a run.

Fair general rules for the use of fire would seem to be as follows:

During the tentative or first stage of an infantry fight, from two thousand to eight hundred yards, the fire should be limited to those objects which are clearly seen, are sufficiently large to present a fair chance of being hit, or against those parts of the enemy's line of which it is wished to know the dispositions. Once the fight comes within the second zone, viz., eight hundred yards from the adversary, the fire may be strengthened to the utmost. It will, therefore, often be advantageous for both sides to make use of tiers of fire, such as the Turks employed at Plevna. This will usually be easier for the defensive than the offensive, though the latter may be able sometimes to deliver long-range fire from the second line, or even from the supports of the first.

These proposals will no doubt have somewhat a tendency to increase the expenditure of ammunition. This, however, is necessary if the long-range weapon is not to be confined to the old short range, and why it should be thought better to kill your enemy at two hundred yards rather than at eight hundred yards, I confess appears to me inexplicable.

The question of long range and ammunition supply are therefore intimately bound up. Probably the simplest plan would be to give each man entering action one hundred and twenty rounds. We are, therefore, rapidly coming to the day when kits must be carried for the men to meet the necessity for giving the latter a portable intrenching tool as well as more ammunition. Is it possible to supply ammunition under long-range infantry fire? Neither wagons, carts, nor mules could be brought sufficiently close for the purpose, and if men are relied on to bring up the cartridges, they can carry only a limited amount and may be killed. Better, therefore, give each individual a good supply to start with, and trust to making up deficiencies from the pouches of the men knocked over. This ammunition question is of the highest importance at this moment, when the introduction of magazine rifles seems to be a question of a very short time. When they are brought in, the short rapid fire from them at the closing moment will tend still more to abolish the prospect of a hand-to-hand struggle with the bayonet.

And now I will ask you to revert to my assumption regarding the fifty thousand bullets. It is plain that to pour in this number in the case of Fig. 1, either the enemy must be delayed a sufficiently long time in crossing the dangerous zone,—*i.e.*, obstacles must be made use of,—or means must be taken to increase the length of line from which fire can be delivered, *i.e.*, it must be broken up into salients and re-entrant. Now, in old treatises on fortification and on the occupation of positions, you will find it laid down that the best way to occupy a position is to divide it up, as it were, into a series of bastion fronts, as shown in Fig. 5. By this plan the salient points of the position, *i.e.*, those most liable to attack, are well held, and the re-entrants serve as convenient positions for artillery to flank them. The line is thus cut up into a number of points which are flanked as strongly as possible. An enemy thus advancing on the salient found himself struck both in front and flank, and the flank fire was of great importance when the time was limited in which the infantry fire could act. It was also of importance to keep the enemy as long as possible under it, and hence ground which checked the enemy was advantageous. At the beginning of this century, therefore, in choosing a position, it was desirable to have the front difficult of approach, and to have means of subjecting the enemy to a flank fire. To do this salients were a necessity, and these salients would often take the form of detached posts, which may be looked on as so many extreme salients. Taking Waterloo as an example, such points were Hougoumont and La Haye Sainte. Now, a salient is of necessity a weak point. Its sides are liable to be enfiladed, and a more powerful fire can be brought to bear on it than it can return. This is shown clearly in Fig. 6, which also shows how much this weakness has been increased by the increased range of modern firearms. The salient was formerly necessary because flanking fire was a necessity, but it was an evil, because it presented a weak point to the enemy. Under modern conditions, however, a flanking fire may be got without actually having a flank. For, referring to Fig. 7, the larger triangle shows the fire which can be brought to converge on a point from the line AB under modern conditions, *ab* under the conditions of the beginning of this century.

Practically, a force advancing from C then will be four times as long under fire, and will suffer from four times the length of line it did formerly. This being the case, it is plain that a flank is no longer so necessary as formerly.

1. Because direct fire has so much longer range.

2. Because the fire, even from a straight line, by this same quality of long range, is practically a flanking fire, *e.g.*, from *a*A against a force advancing from C.

It seems, therefore, that the modern position should be a straight line with very slight or no salients, which are weak places, and no longer so necessary for flanking purposes.

If this be true, the same argument will apply still more strongly to detached posts in front of the battle-line.

A detached post is either so close as to be practically a salient, or else sufficiently far off to be obliged to act independently. In the former case we have seen that it is bad, and I believe it is equally so in the latter, for a detached post must bear the brunt of the attack first, and it is nowadays exposed to so heavy a concentric fire from afar, that unless so extensive as to form in itself, as it were, a position, it will certainly be destroyed by distant fire, or be compelled to yield before the force which can be concentrated against it. One of three things will therefore happen: either the troops in it will retire so early in the struggle that they will not affect its issue, or if they stop they will be surrounded and cut off, or compelled to retreat under the pursuing fire of the enemy. This reasoning does not apply to advanced positions. It may happen that in defending a given portion of ground it may be desirable to hold a position in front to command ground advantageous to the enemy. Such a position, however, will be held in force, and although a second struggle may take place on the main position behind, it plays during the struggle for its maintenance so important a part in the fight that it may almost be regarded as the main line. Such positions were Hougoumont at Waterloo, and St. Hubert at Gravelotte.

These considerations serve to show that, unless for some special object, detached posts are a mistake. This I think we have exemplified at the battle of Gravelotte, by the French holding the village of Ste. Marie-aux-Chênes, which, two thousand yards from the French line, certainly retarded but very little the German advance.

And now as to the kind of ground in front of a position. In the old days of feeble and slow fire difficult ground in front was the best, but now, with modern long-range, quick-firing weapons, the most deadly ground we can offer is a smooth glacis-like slope. Such ground we know the Prussian Guards advanced over in the attack on St. Privat, and we know what their losses were. Fig. 8 gives a section of this ground sloping on an average of about $\frac{1}{40}$. Compare this with the ground on the Rotherberg at the battle of Spicheren. Here the slope was $\frac{1}{4}$; the Prussians suffered in the crossing leading to it, and when on the top. But we know that at the base the attacking troops found shelter, and that when the attacking force—I allude to the frontal attack—gained the first shelter-trench, it was to the surprise of the defending troops. What does this mean? Why, that the slopes were so severe that the troops could not fire down them well, *i.e.*, without exposing themselves by standing up. This same Rotherberg illustrates and confirms the danger of acute salients. The French artillery early in the day were driven back from their advanced position. The advanced shelter-trenches were carried, but from the moment the French line was thrust back to Gifert's Wald the advance was stopped, and was only afterwards pushed on when the flanking movement through the wood was developed. The bastion-like projection of the Rotherberg, which would have been useful under old conditions to flank the Gifert's Wald and the ground to the left towards Stiring Wendel, seems to me to have been positively a source of danger to the French force in the manner it was held. Far better would it have been to have drawn the line across the neck, where the troops, unseen from below, would have received the Germans on mounting with their fire undamaged by that of their adversaries. It would also have acted as a traverse to troops told off to flank the Gifert's Wald, who might have been placed on the eastern slope. Similarly the steepness of the ground at Floing (battle of Sedan) seems to have sheltered the Germans in their advance.

This last suggestion leads me to another point. Should the edge of a plateau, as A, Fig. 9, be occupied, or should the position be taken up farther back, as B, say six hundred to seven hundred yards? A large school of French tacticians say the latter, because the portion A*a* being towards the middle or highest point of the trajectory of the projectiles fired at A is so shot-swept that troops in it (supports and reserves) would suffer equally with the firing-line at A. Theoretically this is quite true, and practically it will happen where, as at Spicheren, for example, the edge of the plateau slopes gently up. Those present who have visited this battle-field will have, no doubt, remarked how from the ground below the Exercir Platz, from the Galgen Hohe, and from the Folster Hohe the anterior portion of the Rotherberg is visible. In these three positions successively the German artillery acted with considerable effect against the French. Infantry coming forward to strengthen the force holding the Rotherberg were kept back by its fire; the French guns on the neck were driven back. But here was a totally different state of things to what ordinarily obtains, for it is but seldom that we find such a long intermediate slope as was here the case. In order, then, in cases such as Fig. 9, that the fire should sweep the edge of the plateau, what is required? The edge must occur in the top of the trajectory, *i.e.*, that, roughly speaking, the troops shall be firing with an elevation double that required for the range, so that the point A shall occur in the centre of the trajectory. But as A is above the firing-point, in aiming at it a certain amount of elevation will be given, and it follows, therefore, that the proper angle of elevation to be used would be that due to double the horizontal range, less the amount obtained by aiming at A instead of *p*. It seems to me, therefore, with the greatest respect to the theory, that in practice the danger would be less great than is sometimes imagined. On the other hand, by withdrawing from the edge we lose the advantage of view; we cannot see what the enemy's movements are, and we limit our resistance to the short space between the edge of the plateau and the drawn-back position, which is to a great extent throwing away the advantage of long-range weapons.

As a general rule, therefore, where the front of a position consists of one long slope, the top should be occupied. Where the ground in front is as shown in Fig. 10, the balance of advantages and disadvantages must determine whether *a*, which sweeps the lower part, *b*, which sweeps the intermediate section, or *c*, the retired position, should be chosen. I think that if troops can retire from *a* under cover, for instance, through a wood or hollow road, this is far the best, as enabling the force holding it to commence stopping the enemy from his first appearance. Failing this, *c* is the best, because here the troops are safe from fire, and have a fairly wide zone in front of them. The worst is *b*, because here the enemy can approach pretty close under cover, and because the zone in front is so shallow.

The angle of slope of the ground in front will also affect the question of the position to be held. Where this is steep, as at Spicheren, the men, to fire down it, must stand up. In such a case the withdrawn position is the best, and I am inclined to think should be occupied when the ground in front rises more steeply than 10°, *i.e.*, about 1 in 6.

From what I have said, therefore, I think it is possible to lay down three general rules, viz.:

1. The position should be as near as possible straight.
2. Detached posts should not as a rule be occupied in front of the line, and the latter should be taken across the neck of sharp salients.
3. The front line should be on the edge of the ground sloping up to it, provided this can be swept by fire, and where this is not the case it should be drawn back seven hundred to eight hundred yards beyond the edge of the plateau.

If these rules be right, it seems to me that at Spicheren, on the central portion of the field of Gravelotte, the French were wrong. In all these cases they seem to have lost sight of the alterations in tactics due to modern weapons, of which the above given rules are the outcome.

Time does not allow me to enter into a detailed inquiry into this question, but I think that any one who will bear these rules in mind, and will examine into many of the battles of 1870–71, will see that in all cases where they were violated it was to the detriment of the troops concerned.

And now I must call your attention to one more point connected with the occupation of positions. It is universally admitted that the soul of the defensive lies in the power of assuming the offensive at the right moment. But if the line occupied is to be as far as possible straight, it is plain that any issuing out of it will be difficult, if not impossible, unless in the form of a pursuit after an attack has been driven back. To admit this, however, would be to limit very narrowly the use of the offensive. On examining the matter more closely, it will be seen that this is again a question of modern alterations in old tactical forms.

In the days of Napoleon usually the most effective point to penetrate the enemy's line was the centre. It is equally so to-day, but an assailant attempting this against a strongly posted defender would, owing to the large amount of fire which could be brought to bear on him, seldom be able to succeed, and he will therefore be limited to frontal attack or to turning one or both flanks, according as numbers allow. Now in attempting this latter manœuvre it is that opportunity for an offensive return will be offered to the defender. For an enemy attempting to turn the defender's flank himself offers a flank to attack, and it is against this portion of his forces that the counter-attack should be directed. Plainly, therefore, when a flank is liable to attack, troops should be massed behind it, not only as reserves, but also with distinctly offensive views. What might have been the result had the French Guards been on Bazaine's right flank at Gravelotte, and been able to assume the offensive when the Prussian Guards' attack was first brought to a standstill? Issuing out between Roncourt and St. Privat, they would have penetrated between the Prussian Guards and the Saxons, and have placed in deadly peril the already sorely tried Ninth Corps.

These considerations, then, lead to the general deduction that, on the defensive, offensive returns should as a rule be made during the fight from the flank threatened by the enemy. This will not of course prevent a general assumption of the offensive such as Wellington always employed at the end of his offensive-defensive battles.

This rule, then, leads to the consideration of the best method of securing the flanks of the defensive position until the offensive is assumed. Looking to the fact that it is from the flank that the counter-attack is to be delivered, it will evidently be desirable to take our defensive measures bearing this end in mind, and for this purpose putting aside the case of a flank resting on an impassable obstacle, it seems to me that a strong point held in extension but not in front forms the most favorable solution of the problem, combined with the massing of troops in rear of the flank, both for offensive and defensive operations.

A defensive position, then, drawn up under these conditions, would consist of a front line, a second line to support it, small reserves to strengthen weak places, and finally general reserves for offensive purposes on one or both flanks. The point held in extension serves a double purpose. Not only does it extend the line held, and therefore forces the enemy to prolong—*i.e.*, attenuate—his line, but it forms a *point d'appui* for the counter-stroke, while not being liable to the concentric attack of a post in front, it is nearly as secure as any other point in the line.

I should now like to say one or two words with regard to modern artillery. It is difficult to say what the effect of shrapnel will be. It is an untried projectile in war on any large scale. Again, there is another new projectile, the double-skin common shell, which breaks up into a very much larger number of fragments than the ordinary common shell.[1] Both these will probably tend to bring up the effect of guns to what it was before; that is to say, nearer to the effect produced in the days when grape and case might be looked upon as the main projectiles of artillery. There is one thing that I think we shall see in all future wars, namely, a tendency to handle the artillery as a separate arm, by which alone its proper effect can be obtained. We shall look upon it not as a mere auxiliary, but as acting to a certain extent independently. We shall see it pushed forward early in the action, concentrated in large masses, and also used in the tentative attack which I sketched in the early portion of my lecture. But this independent action will also expose the guns more, for at the commencement of the battle the large masses of guns pushed forward, with the advanced guard only as an escort, would offer an opportunity to the enemy for an attack which they would not get later in the fight; such as the French had against the artillery of the Ninth Corps at Gravelotte. Again, the necessity of pushing home the artillery attack involves the use of shields to provide against the increased effect of the small-arms. I would suggest as a possibility that we might work our artillery on rather different principles. We should use the teams to take the guns into action, and then remove all the horses except perhaps the pair of wheelers, just sufficient to move the gun, taking the bulk of the horses and men to the nearest retired position where they can be in tolerable safety, and work the guns by relays. One of the commonest things one comes across in reading military history is the way in which guns are stopped in their movements by the loss of their teams; either you must have reserve teams, or you must separate them somewhat in the way sketched out.

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[1] See my article on "Modern Field Artillery," vol. xxvi., p. 737, of the *Journal*. —W. H. J.

It is too much to say, as is often said, that the days of cavalry on the battle-fields are gone. The elements which have always constituted the strength of cavalry still remain, namely, speed, and the rapidity which this confers of moving a large mass of men from one part of the field to another. This is a very favorable opportunity for the use of cavalry early in the battle, when the large masses of guns are pushed to the front. No doubt the cavalry would suffer heavily in such an action; but cavalry must not expect to go to war without suffering loss, and I am sure that a good dashing cavalry leader would often be able to produce such an effect against the guns as our Union Brigade did against those concentrated against the British left centre at Waterloo.

During an action, also, there will be employment for cavalry in wide turning movements. You must remember that we have not seen any pitched battles, fought on a large scale under strictly modern conditions, between armies of fairly equal force and organization, and we must therefore guard ourselves against making too many deductions from what happened in past wars. The only really large battle of this description was Gravelotte, where the French had their back to a fortress, so there was no opportunity for any very wide turning movement on the part of the Germans. But where two armies are contending in the open country, I think it would be possible to use the cavalry divisions for such a purpose during the course of the battle. A large mass of cavalry directed against the rear of the enemy must produce an effect. It is all very well for a general to say, "Oh, that is only cavalry coming;" but he does not know it: it may be that the cavalry cover the advance of an army. Moreover, on such duties cavalry would be used dismounted, and their fire having considerable effect would be an additional weapon in their hands for such an outflanking movement.

I cannot help thinking, also, with regard to this subject, that the mitrailleur is the proper weapon for horse artillery. Horse artillery acting with cavalry only have to deal with man-killing,—they do not want to beat down the cavalry they are opposed to; what they want to do is, the moment the cavalry are about to come into collision, to produce the greatest possible effect with fire, and it appears to me that the mitrailleur properly mounted on a four-wheeled arrangement, from which it can be fired without unlimbering, would be the proper weapon for horse artillery. I am quite prepared to admit that it would be possibly desirable for certain purposes to supplement these mitrailleurs by guns carrying common shell, but for the actual fight of *cavalry* v. *cavalry* the mitrailleur is the weapon. The power of pouring in a tremendous long-range case fire in such a position must produce a great effect on the opposing cavalry.

There is another use for cavalry, namely, for organized raids, such as the mounted infantry, the armed men on horses which the Americans employed. We know at the present moment that the Russians have a very large force of dragoons on the Prusso-Austrian frontier, and these would in all probability be used the moment war was declared for raids into the enemy's country, to cut his communications and to interfere with his mobilization. Similarly the German cavalry division in Lorraine would probably be used for the same purpose against France.

BALLOONS.

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I.

PIERRE MONTGOLFIER, a rich paper-maker at Vidalon-les-Annonay, had a number of children. We know of but two, Joseph and Etienne. Joseph, the elder, born in 1740, had a very independent character, almost savage. At thirteen he ran away from school and went to live in the caves by the sea. Being soon found in a most dilapidated condition, he was replaced at his studies, but he had the same disgust for the purely literary as before; but, on the other hand, he acquired a solid enthusiasm for mathematics, physics, and chemistry, and when he decamped the second time it was to make Prussian blue and various other drugs, which he sold to support himself. Etienne, his five-year younger brother, on the contrary, was a model scholar, perfectly well-behaved, and promised to, and did become an accomplished gentleman,—a *littérateur* rather than a savant. It was Joseph who had the first idea of ballooning. There are different accounts as to how it originated. Some say (it is always necessary to have a story) it was suggested by seeing his mother's petticoat expand and rise when it was being dried on a basket before the fire. Another theory is that being at Avignon, he was sitting by his fire meditating how he might get into Gibraltar, then besieged by the English, and noticed a leaf of a book go up the chimney with the smoke. But throwing aside those stories, the simple truth is that Joseph Montgolfier, who had studied and experimented with the carrying qualities of gas, knew that air sufficiently warmed became twice as light, and could be made to rise and carry its load. Having made a satisfactory experiment, he took his brother Etienne into his confidence, and they made the celebrated attempt which he relates himself. "The aerostatic machine with which the experiment was made before the authorities of Vevarais, June 5, 1783, was constructed of linen-cloth lined with paper. This was attached to a net-work made of twine. It was in the form of a sphere, and had a circumference of about one hundred and ten feet. A wooden frame held it together at the base. Through this frame there was an opening for the introduction of the interior gas, which was half the weight of the air outside. The machine could lift and carry a weight of four hundred and ninety pounds. Two men sufficed to start the balloon and to fill it with gas, but it took eight to hold it; they let go at a given signal. It rose with a rapid motion at first, but less quickly at the end of the ascension, which was about six thousand feet; a wind hardly perceptible on the surface of the ground carried it about seven or eight thousand feet away; it rested ten minutes in the air; the dispersion of the gas by reason of the imperfections of the construction did not permit it to stay up longer. The wind at the time was from the south, and it was raining. The machine descended so lightly that it did not injure the fruit nor the leaves of the vines upon which it had rested."

One may notice that Montgolfier made believe that he had introduced into the balloon a special light gas; he did not confess that he had simply warmed the air inside by burning a little straw and wool, reserving, as was natural and proper, the benefit of his discovery for his subsequent advantage. Such a success, so complete and unexpected, realized the dream of men from all time. Even in those times, when there were no newspapers, the news soon made the tour of France, and every one tried to repeat the experiment.

There was at that time in Paris a young professor already favorably known for his ability, Dr. Charles. He had the idea, new then, but considerably abused in our time, of making those curious to see sights pay the expenses of them. He opened a subscription list, and commenced the construction of his balloon in August, 1783. He did not know what gas the Montgolfiers used, but he did know that the English chemist, Priestley, had some years before discovered hydrogen, which was five and one-half times lighter than atmospheric air. Whether he guessed that this was the gas used by the Montgolfiers, or whether he obeyed a personal inspiration, he decided to fill his balloon with inflammable gas. It was a happy idea which the future ratified as a good one, and it permitted him to diminish the size of the balloon. His, instead of being one hundred and ten feet, was only one-third the circumference, say thirty-eight feet. The subscription being closed, he immediately made a strong silk balloon, well sealed, but poorly varnished, and placed it, ready for action, in the Place des Victoires, at the workshop of the Roberts brothers. He encountered in this enterprise some unexpected obstacles. As hydrogen is more light than other gases, it is also the less easy to hold shut up in a sealed envelope, for it has a property, altogether unknown at that time, which is called *exosmose.* The filling, which was begun on the 23d, was finished on the 25th. Each day he passed filling the balloon with gas which each night disappeared. He used one thousand pounds of iron and five hundred pounds of sulphuric acid. At last, on the 25th, it appeared half full, and they trying it, were satisfied that it would rise, and made arrangements to transport it at midnight to the Champ-de-Mars. It was placed upon a dray, preceded and followed by police on foot and mounted, lighted by torches, and escorted by such of the populace as observed this strange parade.

The 26th was pretty much taken up with the final preparations, but at five o'clock, in the midst of an immense crowd and the sound of a cannon, and in a pelting rain, the balloon was abandoned to itself. It mounted rapidly, entered a cloud with great applause, then emerging, it passed higher and higher and farther off, until finally it was lost in space.

We owe this account to Faujas St. Fond, a distinguished scientist and a professor in the Museum, whose enthusiasm seems a little exaggerated when we think the subject of it was a little balloon of hardly fifteen feet high, with a lifting power of twenty pounds; it could scarcely have carried up a cat. It came down at Gonesse, and this is not the least strange part of the story. In seeing this shapeless mass stretched on the ground, half swelled out, agitated by the wind, the people supposed it was the carcass of some monstrous animal. It was exorcised, attached to a horse, and dragged along. The most courageous attacked it with guns, and two shots hitting it, from the wounds escaped what they took to be sighs, with a diabolical smell. It was cut and torn into bits, and when its owners came from Paris to regain it they found but the fragments.

No one can imagine the excitement which then prevailed in Paris. The king wished to see an ascension, and according to his order, and at his expense, a balloon was made at Versailles, which was ornamented with mythological figures. It was large, fifty-seven feet high, but despite of its great size it rose rapidly to the height of nearly one thousand feet before it fell eight minutes after at Vancresson. This was the first balloon which carried living freight; this consisted of a sheep, a chicken, and a duck, which were landed safely in a roadway in a forest; the sheep was apparently unconscious of the great honor of having made the first aerial voyage. But these experiments did not satisfy the public. They asked and hoped for a test. There were two parties who expected to profit by this new mode of locomotion. One, the *Montgolfier*, moved by warm air, and the *balloon* (enlarged football), by hydrogen gas. The first full of dangers, but easy to fill, the second offering more security, but more inconvenience; it seemed the right thing to decide between the two.

The Academy of Sciences took up the task. They constructed at their expense in the garden of M. Revillon, a paper merchant in the Faubourg St. Antoine, the largest balloon that had ever been seen; it was seventy feet in diameter, and one would say measured not less than six thousand cubic feet. Every day, in the presence of the authorities of the Museum and of a large crowd, they tested the balloon. The aeronauts were Etienne Montgolfier and his assistant, Pilatre de Rosier. The last, a young man born at Nancy, was a professor in physics at Rheims. He was clever, very active, had a good presence, and was without fear; he made several attempts, and secured the companionship of, first, Giroud de Villette, and secondly, of the Marquis d'Arlandes, and he first made a voyage in the air possible.

The first was made October 17, 1783, in the garden of La Mette. The king and Montgolfier were anxious to start two human beings into the air, but to ascend in a wooden carriage with a fire, which communicating either down or up might at any moment destroy them, was an enterprise full of danger, almost criminal. The king consented, but only to permit two convicts whom he had pardoned to make the attempt, but Pilatre would cede neither the honor of the danger nor the glory of the success. The Marquis d'Arlandes allayed their fears by reciting his story of the successful attempts, and by offering to go up with Montgolfier. Everything went well; they went up three thousand feet, passed over Paris, and descended at Cronlebarbe. The balloon had done its work, but as it was rapidly filled, it was with equal rapidity exhausted. It evidently needed more means of support by combustion. In answer, as it were, to this challenge of Pilatre, Charles with Robert made an ascension from the garden of the Tuileries with the same crowd, the same excitement, and the same cannon-firing. He had greatly improved his balloon, had invented the valve, introduced the ballast, utilized the net and the boat, and made the surface of the balloon impervious, and, learning to fill it quickly, he had brought the science of aerostation to what was then perfection. He made a remarkable ascension; in two hours the balloon had reached Nesles, about twenty-seven miles from Paris. Almost at the same time the Duke de Chartres arrived; he had followed the course as well as he could on horseback at full speed. Robert got out; then Charles, with the lightened balloon, made a new voyage. By chance he encountered two opposite currents; the first took him off, the second brought him back; from that time the superiority of the balloon over the Montgolfier was never disputed. It is not our purpose to follow in detail the numerous ascensions which are well known, those of Proust, Lalande, Morveau, even the princes of the blood, the Duke of Chartres and the Comte d'Artois, and the accidents which have happened to so many. We still remember how Madame Blanchard was tossed on to a roof in the Rue de Provence on a holiday. Her husband, who tried to guide his balloon by a system of oars, came near meeting the same fate in crossing the Channel. He was already in the water in his boat, when a lucky wind lifted him out of the water and carried him to land. Then Green, who came over from England, had, without running so many risks, a much longer journey. A prey to the winds, he watched alternately the welcoming lights of Dover and Calais without daring to descend. At midnight he was over Liege; when daylight came, he was over land covered with snow. He supposed he was in Poland, but happily it was only Hanover. Whilst these experiments were kept up, there was an invention to which we must call attention, viz., the parachute; this seems to have been known to the ancients. In the time of Alexis Comeme (1118), a Saracen, whose very long dress was extended by means of wicker-work, started off obliquely from the top of a high tower. In the fifteenth century Leonardo da Vinci, who was as good a mechanic as he was a great artist, invented an apparatus which he drew and wrote about as follows in the manuscripts which are preserved in the library of the Institute: "If a man have a pavilion of stiffened linen of which each face measured twelve fathoms, and was twelve fathoms high, he could throw himself from any height without fear of danger." Despite this assurance, Leonardo never made the attempt, and it was Garnerin who brought the machine to perfection, and was the first to trust himself to a parachute. In 1792, having attained the height of over two thousand feet by means of a balloon, he cut the cord which bound the parachute and its car, in which he sat, to the balloon; this blew up, and the parachute descended rapidly with such a frightful oscillating motion that the greatest alarm was felt by the crowd of spectators. But Garnerin came safely down, and mounting his horse rode off to the National Institute, which was in session, to announce his success. The parachute became at once the usual attraction at public fêtes. His niece, Eliza Garnerin, made a great reputation by her skill and courage. The slackening of the fall could be regulated, so that Sivel, at Naples, took forty-three minutes to descend five thousand feet. The men who were engaged in these matters were of different conditions. The two Montgolfiers were loaded with the king's bounty.

Their father was made noble. Joseph received the cross of St. Michael, Etienne an annuity of one thousand francs, and forty thousand livres were put at their disposition to continue these experiments. To them we are indebted for the hydraulic ram, which would alone have made their name illustrious if balloons had not already done so. Joseph died the last, in 1810; he was a member of the Institute. Dr. Charles became one of the most distinguished professors of his time. Faujas became a noted geologist. The most audacious of all, Pilatre, the first of all to trust himself to a voyage in the air, was killed, in his twenty-ninth year, in an ascension of which the details are scarcely known. He had an idea that by combining the Montgolfier and the balloon he could go up or come down by regulating the heat, and without the use of ballast. Against the warning which Charles gave him as to the danger of associating hydrogen and fire, he left Boulogne June 15, 1783, at seven o'clock, intending to cross the strait. He took with him one of his workmen named Romain, but refused, in spite of liberal offers, to permit the Marquis de Maisonfort to go, because his experiment was doubtful, and he did not wish to expose the life of another. The spectators saw the balloon go up and put out over the sea; it had attained an altitude of about two thousand five hundred feet, and was more than a mile from the shore when a contrary wind began to blow it back. Some thought they could see movements of alarm on the part of the inmates, while a blue flame appeared on the top of the balloon; then it was precipitated, not into the sea, as some have inaccurately stated, but on the shore, a few hundred paces from the water, in front of the tower of Croy, not far from the place where Blanchard, more lucky, had landed. Romain still breathed. Pilatre was dashed to pieces. The Marquis de Maisonfort, who so narrowly escaped the same fate, tells us this story, and rendered the last offices to the two victims.

II.

The direction of balloons, which Dr. Charles believed possible, was not to be realized so soon. It is a complex problem, which takes a great while to comprehend. All kinds of people have meddled with it, especially the ignorant. They have thought generally that if the winds suffice to direct vessels, they could render the same service to balloons. The answer is plain: the vessels all have a *point d'appui* on the water. Balloons, not having that, are not dirigeable by the effect of the wind alone. It is that we seek to explain. When the balloon is secured, we see the rope by which it is held agitated by the action of the wind. It is affected by the wind precisely as a house or tree, or any other object which is permanently fixed or held like a kite. All these show a resistance because they each have a *point d'appui*. Released from this, they yield to the wind and follow it. You have seen a balloon just before the start threshing the air, with the noise of its flabby sides grinding against the ropes which hold it to the earth, now lifting the men who are fixing it, off their feet, now banging itself against the ground as if to tear itself to pieces. This balloon, once set free, sails off in the wildest storm, without jolt or wabbling, or even vibration. It is free to obey the air which has carried it off and partakes of its movements, and whether the breeze be fierce or feeble, a hurricane or zephyr, the aeronaut does not feel it, for he has become part of it; the clouds which are about him, sailing along in company, keep their relative positions, and as he judges of movement by the displacement of objects, and there is no displacement, he seems to be immovable. He sees the smoke of a cigar, the flame of a candle mount upward quietly, the cords of the balloon hang vertically and stationary, the folds of a cloth rest in repose; and all these things go on as well in the midst of the most violent tempest as in the most perfect calm. In a balloon there is no wind,—there can be none.

Not only are we unconscious of the force which carries us, but when we fail to see the earth we have no means of knowing where we are. The compass or the observation of the stars can show which is north or south, but we cannot tell whither we are going, for we seem not to be in motion. Beneath the clouds we can measure by an imaginary line, over which objects disappear in a contrary direction, but above the clouds we are absolutely lost, without the possibility of knowing where we are, if we move, or which way we move. Since the balloon follows the movement of the air, since the wind, no matter how powerful it may be, cannot make itself felt, it is impossible to use it, to modify in any degree the direction towards which we are absolutely drawn. No form of balloon, no device of mechanism, nor helm, nor oar can change these conditions nor make the balloon obedient to the power of the wind, for that power is not there. The necessary consequence of that theory is, that if we wish to guide a balloon we must provide a force; a motor must be found capable of drawing some propulsion which can, if need be, overcome the atmospheric currents. A bird has not only wings, it produces the muscular force which gives action to them. In the same way the balloon should be towed by some machine doing its work. That such a machine should be a spirit motor, electric, steam, or gas, makes no difference in theory, but whatever it may be, one is requisite. It is the indisputable necessity which must be submitted to guide a balloon. We must not only find a motor, we must find out how to employ it. Here we find confronting us the terrible question of the *point d'appui* of action and of reaction. Take some examples. You fire off a gun, the burned powder produces a gas which expands. This is the force,—it drives out the ball; that is the action,—but the gun recoils; that is the reaction. The only reason the gun does not go as far as the ball is because it is heavier. An animal expands his muscles to leap: the earth recoils, but it is so large that the recoil is not noticed. This may be otherwise stated by saying that the ball takes its *point d'appui* from the gun; the animal leaping, from the ground. The same thing occurs in navigating other than sailing-vessels. The paddles drive the water behind; the boat goes ahead. In the case of a screw, you see a mass of water dashed backward, which recoils. Lastly, the air obeys the same law, and performs the same functions. It serves as a support, and to conclude, if we attach to the boat a screw, of which the axle is horizontal, and we can make it move, it will advance on account of the pressure on the outside air. It will carry the boat and balloon, and altogether the system will become a veritable ship, with the single difference that it will be in another fluid,—in the air instead of in the water. To complete the resemblance it will be admitted that the form should be elongated, and a steering apparatus should be added. This construction carried out, the balloon could be steered as might be required in the atmosphere in repose, but in a current of air it would be necessary to add a last and essential provision. When the air is completely tranquil the balloon has in all directions the one and the same speed, that which it gets from the motor, and which may be called its own speed. When there is motion in the atmosphere there are two, its own and that of the overlying current. If both are parallel and in the same direction they will be joined, but if they are opposed, one of three things must happen: 1. Its own force is superior to that of the current, then the balloon overcomes it. 2. The two are equal, then they neutralize each other and rest in space. 3. The current is more powerful than the motor, then the balloon recoils. The first case only will permit the balloons to go against the wind, and as the wind changes constantly, it follows that on some days they can go and on others they cannot. The question is one of mechanics,—to make a motor strong and light. To sum up, the solution of the problem depends on four things: 1, a motor; 2, a screw; 3, a helm; 4, wind less powerful than the motor's speed.

III.

We know now the reasonable theory of balloons, let us run hastily over the history of the attempts to steer them. Guyton de Morveau and the Duke de Chartres used oars with some success. Then a man named Vallet thought of the wings of a windmill. He arranged four on the front of a boat, and was able to cross the river in the face of a wind by turning them very fast. Dr. Van Hecke used an Archimedes screw. The name of the screw propellers (helice) was not yet employed. It came into use a long time afterwards, when Sauvage had adapted this method of locomotion to ships. But the organ had already been tried in the air; it was known, it had given important results. An officer of genius, very distinguished, passed ten years in experimenting. Monge considered him one of the best minds of his age. He was called Meusnier. He became a general, was member of the Institute, and was killed at Mayence, in his fortieth year. It was of him that the king of Prussia said, "I have lost an enemy who has done me much harm, but France loses a great man." His papers have been kept, and they acquaint us with his plans for a balloon two hundred and sixty feet long, about one hundred and thirty feet high, which would carry thirty passengers, with their provisions, for sixty days. This balloon could be made longer, and had a rudder and a screw for propulsion worked by hand. Meusnier expected to get a speed of a yard a second, which was manifestly insufficient for steering in the air. In those times Dr. Van Hecke had asserted that high up in the air you could always find different currents, and it was only requisite to go up to find what would suit you the best. Adopting this base of operation, which nothing justified, Meusnier had devised, to ascend and descend, an ingenious contrivance, but not practicable. His balloon had two envelopes, the external strong, completely sealed, and always kept stretched out; the internal one, lighter and impermeable, was to hold the hydrogen; and the space between the two, filled with air, was reached by a tube and a bellows. If he wished to descend he introduced the air, which weighted the balloon down; when he let the air out he went up. By this means, without the loss of ballast or gas, he was able to change his level to any current. After Meusnier, we have to wait until 1842 to meet with an idea more productive. Morey Monge proposed the use of a steam carriage, an idea certainly doubly dangerous from fire and weight. At that time two thousand pounds was supposed to be the least equivalent in weight for a horse-power with its water and coal. This plan was not, and could not be thought of at this time, but it was taken up in 1855 by Henry Giffard (the same man who invented the valuable injector which bears his name). He adopted the long balloon coming to two points, kept straight by a dorsal axle, having a screw and rudder, and sustaining a lightened engine, which did not weigh more than sixty or eighty pounds to the horse-power. It was high pressure, double, with a tubular boiler, with condensers, etc. Giffard calculated that at least thirty-seven men were needed to equal a horse-power, and they would weigh fifty times as much. He made a plan of a very large air vessel, which could carry one hundred and sixty persons, with sufficient food, who could make the tour of the world in forty-one days, at an expense of ninety-five francs a head. But it is far from a project to its realization. When Giffard went to make a more modest and convenient size he found his mistakes. The ascension was successful, the machine worked; but when he was coming down it could not keep its equilibrium, and it fell on its point, and the balloon, getting loose from its net, escaped. Giffard did not like to be beaten, and was about to try again. He only needed perseverance, but he lacked that and money also. One understood for the first time in 1870, during the siege of Paris, what an important part free balloons could play. Numbers of persons risked their lives, and many lost them, in passing the Prussian lines to carry news to the outside from Paris. An aerial post system was established, not, however, for the public, which was quite important. But it was one-sided in its utility: whilst it was easy to leave Paris, it was absolutely impossible to start from the outside with the certainty of dropping into the city. The return mail, so to speak, was carried, reduced to microscopic dimensions, by carrier-pigeons. It was then that M. Dupuy de Lorme, who had never studied the question of ballooning, started at the problem, and, without regarding the former labors in the matter, clearly solved it. He saw at once that no one had secured a motor of sufficient power to resist the wind, which was higher at that time of the year; that the necessity was great, and the time to study too limited, but that one could, however, go sideways by giving a balloon a lateral motion sufficient, for example, to reach Rouen or Nantes, when the wind was blowing to Cherbourg, and in order to do that it was only requisite to give, by the action of a screw, a motion at right angles with the current of air to cause the balloon to take an intermediate direction. Impressed by these ideas, and goaded by the wants of the moment, the government offered M. de Lorme the necessary funds to realize his theory, and imposed, so to speak, this grave responsibility upon his patriotism. He accepted it, and went at once to work, carefully secured the stability of his machinery, and resolved to move the screw by a force of eight sailors, who were accustomed to work at the capstan. He made his balloon cigar shape, to diminish the resistance of the air, but he recognized the fact that to maintain it steady and horizontal it should be always filled, to avoid the accident which Giffard met with. He thought of placing in the interior a small balloon, which he could fill or empty by a valve. Unhappily, notwithstanding his diligence, the machine was not finished before the capitulation. They continued, however, to work on the machine, and it was tried February 2, 1872. It had now only the interest of science, but that was considerable. The balloon was filled with pure hydrogen, prepared by the action of sulphuric acid on iron, and M. de Lorme, who was unwilling to trust any one else, started off on a bad day. After having been carried some distance by the wind he started the screw, and worked his rudder, which at once produced an effect. He fixed the axle in a direction at right angles with the wind, and the balloon followed exactly the diagonal line between the two forces; the one, its own speed, was 2.5 m. (say seven feet); the other, that of the wind, was 14 or 15 m. (say fifty feet). The deviation calculated ought to be fifteen degrees. It was easily twelve degrees, which was sufficient verification of the principles advanced. After this experiment every one could see that the problem was reduced to furnishing this machine of M. de Lorme's with a light and powerful motor. There were the steam-engines of General Du Temple, which had been made so light as six pounds per horse-power, and with which success could have been assured, when the Tissandier brothers thought of a motor which, after having been made the object of much study by an engineer named Froment, had been a long while forgotten. They had it made by Siemens, adopted as the generator of electricity the lightest possible batteries, and kept the long form, the screw, and the rudder. They gave it a speed of 2.8 m.; that is to say, sufficient to move in all directions when the wind was below that speed. They made two ascensions, October 8, 1883, and September 26, 1884. They succeeded in giving the balloon a direction almost contrary to that of the wind, one time even going in its face. It was clear that nothing was needed now but a more powerful motor to achieve complete success. Now we know that Captains Bernard and Krebs left Meudon August 9, 1884, letting themselves go as the wind took them, and then returned to the place of departure. Let us see now how that result was obtained.

IV.

When Giroud de Villette went up in a captive balloon for the first time with Pilatre de Rozier from the garden of Revillon, he was struck by the view from it, the distinctness with which he could observe the landscape. He understood the advantage the use of captive balloons would be to a general in observing the movements of the enemy. At the same time the Convention, at the suggestion of Monge, decided upon the formation of two companies of aeronants. Conté, who "had all the arts in his hand, all the sciences in his head," occupied himself in his workshop at Meudon in the construction of a war balloon. As powder was scarce, and the authorities desired to husband saltpetre and sulphur, it was forbidden to use sulphuric acid, which was then necessary to make hydrogen gas. Conté overcame the obstacle by making his gas by the dry method,—by the action of steam upon red-hot iron. There was another difficulty, that of making the casing of the balloon perfectly tight to such a light gas. Conté invented a varnish so perfect that the balloon could be carried about in an inflated condition and sent up anywhere. He did yet more by devising a special telegraph, by which the aeronant could communicate with the earth by signals which made a complete alphabet. We know that an officer named Coutelle had charge of the balloons at the battle of Fleurus, and by making known the movements of the enemy he contributed to the victory. The service was suppressed under the second empire. Napoleon thought it was no use. There is another cause given for this abolition: it was that Garnerin, the evening of the coronation, December 2, 1804, sent up a balloon illuminated with colored lamps; it sailed all night, reached Rome the day after, passed over the dome of St. Peter's, and stopped in the country at the tomb of Nero. Napoleon, who was superstitious, and saw in it a bad omen, to avert it, abolished the balloon service. It has been stated that the Fleurus balloon was sold at public sale. We have heard from good authority that this venerable and glorious relic was preserved at Metz and fell into the hands of the Germans. But the School of Aerostation was re-established under the second republic, and installed in the park of Chalais, near Meudon, then under the charge of Colonel Lassedat, and attained great efficiency. It was there that Captains Bernard and Krebs found the facilities for making their air-ship. It was much like its predecessors, only differing in details; its motor worked by electricity like the Tissandier one, but with more power. It gives a speed of 5.6 m. (say twenty feet) to the second. It has been a great result, but we were prepared for it. It is not necessary for public opinion to think that there was a secret in the direction of balloons, and that it has been all at once discovered by the last experimenters. It has been a problem worked at by many persons; solved in theory and practice in the calm atmosphere, and the solution extends to the case where the speed of the wind does not exceed twenty feet. It stops there. It is requisite in order to overcome a superior velocity to have new experiments, a better machine; but the unknown author of the desired and coming progress can no more efface the glory of Captains Bernard and Krebs than their success did that of their predecessors.

V.

A century has passed since the Montgolfier discovery. Thousands of ascensions have been attempted, have succeeded, and have excited public curiosity, and yet we must recognize the fact that the hopes of the early days have not been realized. Aeronautics rest to-day only as the amusement of the great numbers or the commonplace business of a few; but the human race has not been able nor willing to employ the science to its wants, with two exceptions,—its use in war, of which we have spoken, and in scientific observations, of which we will say a word. We go up in a balloon; we go as high as possible with the single design of discovering the mysteries of those heights. As to the mysteries we know nothing; but we do learn of the life of the elements upon which we depend. The first point which attracts the attention of the scientific aeronaut is to know at what height he is at each moment. Having observed that the public is not well instructed in this matter, we will endeavor to explain.

The canopy of air which surrounds the earth is attracted, accumulated, and held by its weight, and in the same manner as in a pile of stones, those at the bottom support those on the top. So the bed of air which is laid on the earth is subject to the pressure of the higher strata. This pressure is measured by the barometer. This is a kind of balance formed by a glass tube in two branches separated by mercury. One is empty, the other open to the pressure of the air, which, pressing the mercury, makes it ascend the other side until it attains its equilibrium. The pressure of the air is measured by the height of the barometer, and the aeronaut knows that he is going up when he sees it go down in the tube, and that he is going down when he sees it go up. Thanks to a formula invented by Laplace, one can measure the altitude of a balloon at any given moment by the height of the mercury. When it is at 0.760 m., one is at the level of the sea. If it is reduced to 0.600 m., he is, say, seven thousand feet high, and when it is not more than 0.325 m., he concludes that the balloon has gained an altitude of more than twenty thousand feet. The first voyage consecrated to scientific researches was undertaken in July, 1804, by an English physician named Robertson, who ascended from Hamburg with a friend named Loeth; they came back to Hamburg after an absence of five hours. They reached a height of twenty-one thousand feet. In a second ascension, which he undertook at the request of the St. Petersburg Academy of Science, he did not go up so high. We only speak of the first voyage, and there is little good to say of that, for most of his observations turned out to be erroneous. One of them particularly excited much attention from Laplace and the most learned members of the Institute. Robertson alleged that the vibrations of a magnetic needle moderated in proportion to the rising of the balloon. This observation, if it had been true, would have been attended with grave theoretical consequences; but as the accuracy of the statement was doubted, it was resolved that the inquiry should be recommenced, and the delicate and dangerous mission was intrusted to two physicians, young then, but who had already made their mark by their work,—Gay-Lussac and Biot. The first voyage undertaken in common was interrupted by the wish of Biot before they had gone far. The second was accomplished 14th September, 1804, by Gay-Lussac, who this time was alone. He went up from the gardens of the Conservatoire of Lutz, to an altitude of more than twenty-five thousand feet. He with great coolness made his observations, and descended happily between Rouen and Dieppe. He had experienced very slightly the physiological effect known as mountain sickness; he had been very thirsty, attributable to the dryness of the air; he had seen that electricity is positive; that, contrary to the assertion of Robertson, the motion of the needle was not slackened; that the temperature had regularly gone down to 9° below zero; that the barometer had gone down to 0.328 m., having gone down more than one-half; and, finally, that the composition of the air remained the same, as rich in oxygen, and as good for breathing as upon the soil. The more that went up, the more wished to go. In July, 1850, Barral and Bixio, encouraged by Arago, went up from the Observatoire. They had calculated their ascensional force, and believed it reached nearly forty thousand feet. They counted on the solidity of their balloon, which had been furnished by an old aeronaut, Dupuis Delcourt. But the balloon being in a bad state of repair, was disabled in the start. It was repaired, and on the 24th they made another attempt. The weather was very bad; it rained and blew a gale. These circumstances were the more serious because the balloon was not sound, but, nevertheless, the start was resolved upon; it commenced with a fearful rapidity; they entered the clouds at once, and did not emerge, and except for rare clearings remained in the midst of a bed of mist more than thirty thousand feet deep. At the moment when the sun seemed to be coming out these conditions were changed; the temperature, which had been steady at —9°, fell with inconceivable rapidity to —39°, and there were numbers of icicles on their note-book. Just at this moment, which offered such powerful interest for observation, the balloon began to split. The voyagers threw out all their ballast, which was an imprudence, and it was useless, for they could not exceed twenty-eight thousand feet, a little higher than Gay-Lussac. The balloon, which continued to empty itself through the fracture, descended rapidly. The fall was a disaster; they came down in a village near to Coulommiers. They had the good luck to save their instruments, but had but partly finished their observations. In England the importance of aerial voyages, recognized for a long time, induced the authorities of the observatory at Kew to multiply them. During the year 1852, Mr. Welsh made four ascensions, in one of which he reached as high as twenty-three thousand feet. Later (1858) the British Association, meeting at Leeds, resolved to establish a department of balloons, composed of the most distinguished men of the Royal Society, who, from the nature of their work, took an interest in meteorology. M. Glaisher, of the Greenwich Observatory, was chosen as the scientist, and no one more able or exact, more prudent or brave, could have been chosen. The balloon was to be managed by Mr. Coxwell, an aeronaut by profession. In France neither the government nor the scientific societies followed such a good example. Balloons were left to the mercy of chance undertakings, and to the initiative of some men of public spirit, of courage and disinterestedness. We ought to mention the names of Flammarion, the Tissandier brothers, de Fonville, not to forget a gifted and ardent artist, M. Nadar, who had an original idea: it was to construct an immense balloon, *le géant*, measuring twenty thousand cubic feet. He wished by the attraction of extraordinary ascensions to obtain from the public the sums necessary to build flying machines heavier than air, thus desiring that balloons should collect the expenses to build something to dethrone them. As luck would have it, the attempt was not a success; it ended in a catastrophe. Nadar related, with his habitual fancy, the fall of his balloon, on the edge of a wood, during a storm, the dragging of the car, the accidents which followed, and the dangers from which he had miraculously escaped.

The first result of these difficult excursions is the knowledge that one acquires of the physiological effects exerted on living beings, as to the limits of altitude where life may exist. During the years 1862 and 1863, M. Glaisher made thirty ascensions, the most interesting one September 5, 1862. When up about twenty-six thousand feet he began to feel the mountain sickness. His respiration became more and more painful and short, the pulsations of his heart more frequent, as if that organ was forced to supply the want of oxygen by greater rapidity of its functions; the tissues were distended under the action of an internal pressure; the face appeared larger, the lips more thick and black; then a numbness followed, elective and progressive; it seized his arms, his legs, the muscles of his neck; the head drooped; he had no disposition to move, even to raise his finger to save his life. His vision was obscured, and although he retained his senses, which were distinct and without confusion, the body, little by little, ceased to live. The faint was complete and lasted thirteen minutes. The last observations were made at about twenty-eight thousand feet, and not continued until his awakening. During that eclipse of intelligence the balloon had continued to mount until it reached its maximum, and then came down. It was impossible to determine how far up it had gone. M. Glaisher believed he had been up nearly forty thousand feet. It may be doubted, but two things are certain: he had passed twenty-eight thousand feet,—higher than Gaourichnaka, the highest mountain on Nepaul, and in the world, and no person before had ever been so high. After these brilliant and dangerous observations, it may be permitted to conclude that man cannot pass the mean limit of, say, twenty-five thousand feet without losing his senses. Nevertheless, recent experiences permit the hope that this limit may be exceeded some day. M. Paul Best had constructed an inclosure of sheet-iron large enough to hold several men. They entered by a door which closed hermetically. They can be observed through the windows, through which, in their turn, they can communicate by writing with the outside. This inclosure is something like the reservoirs used in the manufacture of gas to regulate the air, or to introduce other gas. He could vary in any way the condition of existence. When he rarefied the air to the extent of that to be met with on ascensions, M. Best saw produced and developed the same phenomena as we have described; the same causes produced the same effects. He followed with another test,—kept in the inclosure the same quantity of oxygen, and diminished, little by little, the pressure, reducing at the same time the proportion of azote. He had the satisfaction to notice that animal life was sustained in this medium, always as little rich in vital air, but of which you suppress gradually that useless and non-acting gas which has been so well named azote. M. Best, who submitted to the test himself, says that he went through no extraordinary trial up to a pressure of 150 millimetres. He would have continued the test further if his assistants, alarmed at their responsibility, had not decided under a mistake to let air in, and him out of his prison. It is then quite certain that it was not to compression only, but it was rather to the diminution of oxygen we must attribute the asphyxia which came so near killing M. Glaisher.

Confident of these results, which they had themselves verified, and wishing to extend the limit of possible ascensions, two bold men, Sivel and Crocé Spinelli, made a first voyage to great heights, about twenty-four thousand feet, March 22, 1874. They had carried with them small balloons filled with air oxygenized at different degrees, which they commenced and continued to breathe at about twelve thousand feet. The trial was satisfactory. The return of strength, of appetite, of vision, and of general vigor immediately followed the inhaling of oxygen. A relapse of the sickness accompanied a return to the normal rarefied air. This confirmed the experiments made in the reservoir, and decided Sivel and Crocé Spinelli to undertake the fatal voyage which was to cost them so dear. They started on April 15, 1875, accompanied by M. Gaston Tissandier, carrying one hundred and fifty pints of oxygen, a most insufficient supply, for three persons could easily use that much a minute. They had been previously cautioned by M. Best, but resolved to brave all dangers. They persisted, deciding that they would not use the oxygen until compelled by absolute necessity. This imprudent decision was their ruin. When they wished to use the remedy it was too late. Their arms were paralyzed. We know what happened. They were up more than twenty-eight thousand feet. After an hour of lethargic sleep, M. Tissandier remembers seeing his two friends lying in a faint in the boat. Then, some time after, Crocé, who had waked up, threw overboard the instruments, the covering, everything he could lay his hands on, without knowing what aberration of mind he obeyed. Soon the balloon mounted to an unknown height, and finally when it came down, and Tissandier returned to his senses, his companions were dead. Sivel's face was black, his eyes dim, and his mouth open and filled with blood. Crocé, his eyes half closed and his mouth bloody. This is all that is known of the sad event which a little prudence might have obviated. The public feeling was intense, and more than one hundred thousand francs were subscribed to erect a monument to them. It is beautiful so to honor such unfortunate victims. It is not necessary, however, that public opinion should mislead itself. Sivel and Crocé Spinelli were not, as they have been called, martyrs to science; they were really the victims of an improvident temerity, for the dangers they braved were known to them, and the remedy they did not employ. Science has gained nothing by their death, unless it is the proof, dearly purchased, of the impossibility of living higher up than twenty-five thousand feet. That proof was not necessary.

VI.

At the first glance which he throws at the atmosphere, the observer feels discouraged by the multiplicity of its effects. Nothing is so mobile and fugitive as the air. Subject to the wind, which takes all velocities, and blows in all directions, to the warmth of the sun, the cold of the night, the influence of places, dampness, dryness, rain, and fair weather, the atmosphere seems to follow all caprices and to obey no law; but the balloon brings to us the valuable means of enlightenment as to these complications. It is a winged observatory, which carries us into space in an instant, shows the different strata, takes us to visit in detail the actions of aerial nature at each point at the moment of accomplishment, and enables us to reconstitute them as a whole; and whilst the observatories on the mountains, erected on stony summits, are exceptions, when aerial movements are only to be observed under modified conditions, balloons are the simple inactive witnesses, whose only *rôle* is to supervise the elements in their work. Let us look for the laws, if there are such things, of atmospheric changes. First we have the temperature.

It is necessary first to fancy that in the immense space between the sun and the earth—one hundred and twenty million miles—there is no ponderable matter (at least we admit that), and that the temperature is very low,—no one knows how low. To be sure Pouillet believed he could fix it approximately at —142°, but neither he nor any one else has measured it. Let us be content, then, with this vague statement,—it is very low. But in the neighborhood of the earth, say three hundred miles, more or less, the air commences to show itself, at first very sparse, then condensing and accumulating little by little, nearer and nearer the sun, to a final pressure of 0.760

millimetres. Through this structure the solar rays have to penetrate before they reach us. They pass this void without losing any heat. As soon as they enter the atmosphere, which is not entirely transparent, they are partially absorbed by the molecules of air which they warm, leaving to them what they lose themselves. This loss which they sustain, this heat the air gains, and increases to the lowest point, after which the soil, which has received all that the air has let pass, sends it back again from bottom to top. This mechanism is verified by a first and curious consequence. A thermometer, when exposed at the highest limits of the air and shade, shows considerable cold,—the cold of the space at that place; but if it be exposed to the sun's rays, it receives all the energy which has not been diminished, and goes up considerably. M. Flammarion, at the altitude of, say, fourteen thousand feet, noted —9° in the shade and +19.3° in the sun, the difference being 30°. But on the earth it is otherwise; the solar ray having become enfeebled by the absorption by the air, and the air having become heated, the difference between the two is much less apparent. That teaches us not to measure the temperature surrounding the sun, for that would be the heat turned upwards, but in the shade; that is to say, the heat acquired by the air at the given moment. It is evident that this partial absorption of the solar ray increases at the same time that the density of the air is in proportion to the approach of the sun, and one going up in a balloon ought to encounter more and more cold. This *is* what takes place. It is, perhaps, the most important phenomenon in meteorology, the most favorable to our existence, the most astonishing of the physics of the globe, which, being situated in such a cold place, keeps, notwithstanding such a high temperature, thanks to the atmospheric vestment which envelops it, warm at the point of contact, so much colder, as it is farther off. The ancients knew this by their mountain experiences, by the snow which never melted on the high peaks. All ascensions have confirmed it, and it seems safe to generalize the experiments of Gay-Lussac, and to say that the mean of the temperature lowers a degree every five hundred feet of elevation. But this is only an approximated truth. The reality is otherwise complicated, as M. Glaisher says. In his first ascension, January 12, 1854, he had reached an altitude of six thousand five hundred feet. The thermometer having gone down constantly, had reached 2° below zero. Everything led to the belief that it would continue to fall, when it remained some time stationary, then went up until it reached 6° above; kept that temperature until he reached over sixteen thousand feet, and did not go down whilst he was at that height. Since this observation, the first of its kind, M. Glaisher has found the same changes in almost all his ascensions. He had passed over beds of atmosphere separated by ceilings of clouds, which retained in one part the heat of the earth; in another, were interposed as screens to arrest the solar rays, and at each interruption of the continuity he proved these sudden changes of temperature. After M. Glaisher, M. Alluard has recognized the same perturbations. The most curious of all, which we have already mentioned, occurred to Barral and Bixio. We remember that at about twenty thousand feet they were plunged into a thick cloud, with a temperature which had slowly but regularly declined to —10°, and which did not differ materially from that mentioned by Gay-Lussac at the limit of his trip. In rising sixteen hundred feet higher they saw the weather clear. The thermometer fell very rapidly, and went down at once to the extreme cold of —39°, when the balloon reached its maximum of twenty-three thousand feet. It was then the lowest temperature known. It appeared so extraordinary at that time that, on making it known, Arago was obliged to insist on the reality of the observations. To-day no one is astonished; we know the cause. It depended upon the wind, as we shall show.

VII.

What is the wind? A displacement of the air. What is its cause? The rupture of atmospheric equilibrium brought about in its turn by the unequal temperature of neighboring countries. The wind is the most irregular, the most variable of all phenomena. A small height, any accident on the landscape, may alter its direction. When its velocity was six feet a second at Greenwich, it was fifty or sixty feet at an elevation of twenty-three thousand feet. Mountains are the obstacles which it must go around or over. The valleys are the passages along which the currents run. France has its mistral, which goes down the Rhine. Egypt, the north wind, which goes up the Nile. By the sea there are the land and sea breezes. Pilatre de Rosier was first carried towards England, then back to land, where he was killed. M. Tissandier, leaving Calais, first driven over the North Sea with the prospect of not coming back, luckily encountered a contrary wind which brought him back to his place of departure. We see that near the surfaces we are the sport of accidents, but when we reach great heights local influences disappear, and we meet with regular winds governed by general laws; it is requisite to seek them in a balloon. That is what M. Glaisher did.

It is the action of the sun which produces them. Without the sun the air would take and keep a natural equilibrium; with it the air undergoes the periodical heatings, and as it is easily moved it takes very little heat to warm, very little warmth to expand a great deal. One morning suffices to exert upon the mass of gas which surrounds us a considerable displacement, which each day sees itself renewed, and which is one of the conditions of the material life of the globe. Let us recall the theory which the astronomer Hadley proposed, to explain these movements. On a circle parallel to the equator, near it and changing its position with the seasons, the sun is vertical at noon. It is there, it has the most force, there the air is hottest. Being warm, it is lighter, and it rises as if it were a Montgolfier. If it goes up, it answers the call of a new air to replace it at the point which it has left, and the two currents being drawn, as it were, by breathing, start out, shaving the earth; and coming one from the north, the other from the south, these are two inferior but regular winds which are called *alizés*. The points of the globe which the sun strikes vertically, and where they meet, form *l'anneau d'aspiration*. The currents are joined as they rise, like the column of smoke from a volcano. They spread themselves out, then changing their direction, they commence to slip off towards the north and south, and go their own way. From this point, a circulation continues, which results in our hemisphere in a primary low wind from the north, the *alizé*, and the second a higher wind; the south, the opposite to the *alizé*. Resting there, very regular in the vicinity to the *anneau*, they are weakened little by little as they leave. The regularity diminishes and makes way in the higher latitudes for all the atmospheric variations which characterize our climate, and as all circulation is necessarily shut off, it follows that after an excursion more or less long into the northern atmosphere the *contre-alizé* returns to the south. It is difficult to know by what way it returns, and how the circulation is complete. We think, however, that we have guessed at it. And now we see how such things come to pass. We have supposed to simplify the question, that the earth was immovable; as a matter of fact, it turns on its axis once in twenty-four hours, and if a current of air leaving the north in a southerly direction arrives at the equator, it has reached there, despite of opposing forces from west to east, at the rate of fifteen hundred feet a second. But to the inhabitants of the region of the equator, who believe they do not move, the speed of the wind appears to be the same, say fifteen hundred feet a second from the east to the west. No matter what theory may be advanced, the result is that the *alizé* which comes down the coasts of Africa along the Atlantic Ocean has a speed sideways which carries it to equatorial America. Then it is changed into a *contre-alizé* which returns to the north, and which, losing little by little its lateral speed by the rules by which it gained it, acquires in time a direction towards the east. Then it twists around the gulf of Mexico, passes by the United States, then dashing like an arrow towards the east, passes through the Atlantic to sweep the shores of Europe. This is the path of the gulf stream, of cyclones, and of squalls, and the parade can be safely announced beforehand,—their start from America and their expected arrival in Europe. These currents tend towards Norway or England and Calais, to Brest or to Coimbra, guided by local circumstances, which, without altering their direction, serve to modify their courses and their place of arrival. We must give to this theory a high degree of belief, but how much is left to be proved. What influences are omitted. Continents and seas, mountains and prairies? This theory confines itself to two general aerial currents; one, which comes from the north and seems to go to the west, the other, which returns from the south and inclines to the east. No one knows which path they follow. How are they joined in meeting the opposing elements? Are they side by side, or on the top or bottom, and above all, how do they in a regular time cause rains or admit the sun's warmth in the same locality? We see that in giving a general explanation, Hadley has opened the door to a vast multitude of questions, only to be answered by numerous excursions in balloons, but he does tell us something. We learn that the north wind veers to the west, and the south to the east; that is, so to speak, on the right hand of the observer who is advancing in their direction. We owe to M. Flammarion the valuable remark, resulting from his numerous ascensions, that the winds to which he abandoned himself have carried him in constant curves, always turning to the right. We know from other sources that the boreal current is always dry, the austral always damp. This we will explain, in conclusion, as it belongs to the history of the great aerial circulation. As it descends towards the south, as it skims over the face of the ocean, the *alizé* becomes warm as it makes its way, and is charged with vapor. Reaching the zone under the vertical sun, it ascends, cools, and loses part of its humidity, which condenses, forms the ordinary storm-clouds, from which descend those torrents every evening at a fixed hour, and are so well known to the sailor. We may say that the ascending clouds part with their excess of dampness, and the rains limit their refrigeration, and at the end of its ascension it has acquired all possible provision of heat and vapor. Then it starts for the temperate climes to water and warm them. The austral current is to bring the water to our hemisphere. When it is active we have rain. On the contrary, the north *alizé* commences when the austral current has ceased. When the dried air has started for the south it takes vapor instead of giving it, and becomes warm instead of cool. The two currents have different characteristics; they are known by their temperature and their humidity. Let us seek how to measure this humidity at any time, at any height, from a balloon. This requires still a short explanation. A cubic yard of air weighs about thirteen hundred grammes, but it is never dry, but always contains some vapor which is a colorless gas like the air, and almost transparent. If it contains thirteen hundred milligrammes, we say its *hygrometric value*. is one-thousandth part. Generally the value is the proportion of the weight of the vapor to the air which contains it. This proportion is always very small, does not exceed eight or nine one-thousandths part and varies. If there is very little vapor the air is dry; in the ratio of its augmentation, it becomes more and more humid, but it cannot exceed a maximum unless it condenses. When this is reached the air is said to be saturated. To reach this saturation the vapor should increase as the temperature goes up. If the air is saturated at 10° it ceases at 20°; but in returning, when brought back to 10°, it passes the limit at 5°. Then an important change occurs. As this vapor cannot be contained entirely in so small a space, it partly condenses, producing squalls, clouds, rains, and all aqueous meteors. In all his ascensions M. Glaisher measured these hygrometric conditions by well-known instruments, and published the result, from which were gathered the following remarks. We know, first, that the hygrometric richness is the greatest possible on the level of the soil. It was as a mean eight-thousandths each time at all seasons of the year. Then it lowered rapidly as he went up, and from the height of six thousand five hundred feet it remained nearly stationary, or only diminished a little to the altitude of, say, twenty-three thousand feet, the highest limit possible of the altitudes observed. On the 26th of June, 1863, M. Glaisher went up at Wolverton; the weather, fine in the morning, grew gradually worse, and towards noon a veritable tempest came up. The ascension, retarded and rendered dangerous, took place at one o'clock, and the balloon encountered successive layers of squalls and rains from the earth to the height of twenty-five thousand feet. The hygrometric value was considerable, and diminished rapidly but slowly. At the limit it was still noticeable, and so continued, very probably, above. The falling of the temperature was slow, and was limited to 8° below zero. They met there the warm and damp strata; they were in the austral current. But on April 8, of the same year, M. Glaisher met conditions entirely opposite. After having passed a bed of clouds slightly thick, he was sailing in blue sky. The mercury went down rapidly, and the hygrometric value had gone down so that it was nothing at fifteen thousand feet. At this elevation there were no more vapors appreciable in the atmosphere; the balloon was swimming in the boreal current. One knows by the experiments made by Tyndall that the vapor of the air is not readily penetrated by the solar rays, and that it covers the earth with a garment which receives the heat of the sun during the day, and prevents it from disappearing in the night. Tyndall described, in an eloquent picture on this subject, the disasters which a single night would cause to England if the air was deprived of its vapor,—the invasion of the soil by such cold as would exceed any provision, the water-courses congealed, all vegetation destroyed, all life annihilated, etc. On April 18, 1863, from a moderate height, the air did not contain any trace of dampness. We never heard that any of the woes predicted by that eminent physicist had threatened the country, but we may remember that in that spring we had most destructive frosts at sunrise, those colds of the burning moon, which worried, with so much reason, the agriculturists of all countries. The cause was plain,—the want of vapor in the higher regions. Since we may measure by these ascensions the weight of vapor contained at all the points of a column of air twenty-five thousand feet high, we can calculate what will be the height of water which would cover the earth if all that vapor fell in rain at a given moment. We find it would be .014 m. in April, 23 in June, and 35 in August, and from that time, after having increased, it would diminish until winter. That is the reason that there is most rain in the spring, least in winter; that it is increased by the austral current, and diminished by the boreal; and it shows that all the year round the atmosphere contains enough moisture to furnish the earth the rain it needs. The mechanism of the formation of this rain is one of the most curious natural phenomena. To explain, we must recall the celebrated observation made by Barral and Bixio previously spoken of. After having met at twenty thousand feet a temperature lowered to 10° below zero in the midst of continuous squalls, they saw the heaven clear, and the mercury go down to 39° below, and crystals of ice, very thin, swim in the surrounding air, circumstances which have often since been observed by M. Glaisher. See how they are explained. The last strata of the austral current throw their rays of heat towards the space which is limpid, and they are cooled. This brings about an excess of saturation, a precipitation of waters, which at that temperature freeze into fine crystal needles. These are what Barral and Bixio saw. They fall upon the lower beds, which are not saturated, and evaporate anew. To sum up, a certain amount of vapor has left the higher layer, which has become dry, and is finally transported to the lower trenches, which have become more moist, and there play the *rôle* as above. This goes on like a waterfall, leaping from high to low, and is characterized by a descent of water, of which the whole provision is finished upon reaching the earth; not at one time, but little by little. Keeping right on, it is characterized also by a progressive descent of the heat, which is replaced by the cold, to the point that when it arrives at the pole the austral current has kept neither the warmth nor the moisture of which it laid in a stock at the zone of aspiration. These examples, which we do not wish to multiply, make us understand the services that balloons have rendered, and can render in the future to meteorology. In terminating the recital of his perilous voyages, M. Glaisher regrets that England should be an island of so little extent that it would not be possible to have longer nights, and continue them longer. He appeals to France, the country of balloons, to continue his work. We add very cheerfully our wishes to his, but with little hope to have them granted. It is a work of long patience and too great expense to be attempted to-day, but one that a near future will accomplish without any doubt. Balloons will make us acquainted with the laws of atmospheric electricity, of which we know nothing; on the variation of aerial currents, of which we are not more familiar. What valuable discoveries await us on that side! On the other hand, what fearful aggravation of the horrors of war may not balloons bring about? One cannot even think without fear of the fate of towns besieged, over which a balloon may empty out a load of dynamite. As to their use for business or pleasure, we sometimes think that humanity hopes far too much from aerial navigation; but it has been a dream, and what has been hoped for, will never be abandoned. But who can foresee the future of human inventions when they once begin? More than ever one may repeat Franklin's remark about balloons, *C'est l'enfant qui vient de naître.*

GERMAN MILITARY PUNISHMENT.

BY C. J. L'ESTRANGE.

THE unqualified success of the German military system has won for it that imitation which is said to be the sincerest form of flattery. Such flattery has been doubtless little appreciated by the German authorities, who see the most salient points of their military organization appropriated by the enemies of the Fatherland. If not actually in danger of being hoist with their own petard, they have at least taught their enemies that art of war of which they had till then thought themselves masters. Never had the military prestige of a nation deeming itself unconquerable been so rudely and hopelessly shattered as that of France in 1870–71; never did organization, equipment, and above all discipline, contribute more to the defeat of a brave but comparatively undisciplined and unequipped army. The defeat of the French was the lesson of Europe; and since that time the veriest details of the German military system have been assiduously copied or adapted by the most powerful Continental nations. It may, then, be interesting to note the manner in which the discipline of the German army is maintained in the case of those black sheep which are proverbially to be found in every flock.

The greatest of living German generals, addressing the Reichstag in 1878, said, "Authority from above, obedience from below, in one word, discipline, is the soul of an army. An army without discipline is always costly, in war useless, and in peace dangerous." Admitting, then, the vital necessity of discipline to the coherency and practical utility of an army, it must be maintained by all available means, however harshly and severely they may fall on the individual. The spread of modern democratic doctrines is directly opposed to subordination,—the very essence of discipline. The higher the intellectual cultivation of the recruit, the less will he be disposed to recognize either a theoretical or a practical inequality, the more forced and unnatural does subordination become. It must be borne in mind that army discipline does not form a part of civil morality, nor does it appeal to what has been called the "inherited conscience" of the recruit. It is essentially artificial in its nature, and its acquirement becomes yearly more difficult and tedious.

The means by which we seek to discipline the recruit are manifold and various in their nature: education, the conscientious fulfillment of every military duty, and strict attendance at drill; in one word, obedience in the most minute particular to every military regulation; emulation, reward, and punishment.

However highly we may estimate the importance of other methods of military education, the requirements of discipline are so wide and so varied that they can only be met in the last resort by military punishment. Those who differ from this view must totally ignore the resistance offered by human nature when called upon to waive its will and perhaps its judgment at the command of another. "The power of the passions can only be checked and curbed by that of the law," said Scharnhorst; and in the speech above referred to, Field-Marshal Count von Moltke delivered the following remarks on the necessity of stringent military regulations:

"Punishment is on no account the sole means by which we maintain discipline. The whole education of the man is necessary thereto. If our military punishments be lighter than those of other armies, the fact is due to the better education of our troops. More important even than what he learns in school is what the future recruit acquires after leaving it,—order, punctuality, cleanliness, obedience, conscientiousness; in one word, discipline, and it is this discipline that has enabled our army to win three campaigns. Nevertheless, we cannot dispense with punishment. You will confess that it needs an extraordinarily powerful authority to persuade or coerce thousands of men, under the most distressing conditions, to carry out an order where the chances are in favor of suffering and death. Such an authority can be maintained in the last resort only by checks and punishment on disobedience. For the greater part of our troops severe military punishments are not needed. They can be influenced by education, emulation, and censure, or at the most by light disciplinary penalties. But it must be remembered that we have to deal in part with bad characters, for, when universal service is the rule, the objectionable elements common to every nation must also be enlisted. We are bound to receive all who have arrived at the required age, who are sound in health, and measure a certain number of inches. We cannot inquire into the moral character of the recruit; and men must be accepted who are too probably candidates for the prison, or would inevitably become so were it not for the strict military discipline they are compelled to undergo. The necessity of this military education makes us disapprove of a very short period of service, for discipline cannot be drilled into the recruit, it must be the gradual growth of his military career."

Although the necessity of military punishment is beyond serious dispute, there exists nevertheless considerable difference of opinion as to its character, and the manner in which it should be enforced. It is of course apparent that the punishments employed in an army depend on the character and general laws of the nation whose interests it protects. The law-giver, military or civil, expresses simply the general opinion of his time and country. Each period of history has had its own peculiar punishments, differing more or less widely from those of the preceding epoch. On the whole, however, we notice that with the general spread of civilization there is a constant tendency to make the way of transgressors less and less hard. The principle involved in Draco's reply to the question why he made death the punishment for most crimes, that "small ones deserve it, and I can find no greater for the most heinous," has been considerably moderated at the hands of succeeding legislators. The gradual change from severity to comparative leniency in the punishment of civil offenses has been accompanied by a similar modification of military law. Whether this modification has been favorable to the interests of society is a question which it would here be out of place to investigate. The fact, however, that military law has been constantly modified is an important and indisputable one.

The punishments in vogue in the German army are authoritatively set forth in the "*Militär Strafgesetzbuch für das deutsche Reich vom* 20 *Juni*, 1872." This book owes its existence to the unification of civil codes consequent on the foundation of the empire. Whilst the civil code of the year 1871 came into force throughout Germany on 1st January, 1872, the soldier of the German army was still subject to the military code of the kingdom or duchy to which he belonged. There were at that time four different *Militär-Strafgesetzbücher* in the German army:

1. The Prussian *Militär-Strafgesetzbuch*, from the 3d April, 1843, operative in the territory of the North German Bund, excluding Saxony, also in those parts of Hesse and Baden belonging to the Bund.

2. The Bavarian *Militär-Strafgesetzbuch*, from 29th April, 1869, for Bavaria.

3. The Würtemberg *Militär-Strafgesetzbuch*, from 20th July, 1818, for Würtemberg.

4. The Saxon *Militär-Strafgesetzbuch*, from 4th November, 1869, for Saxony.

The co-existence of so many different military codes of punishment was, of course, incompatible with the otherwise complete unification of the German military system; and it was found necessary to compile a *Militär-Strafgesetzbuch* for the German army as a whole. The need of such an unification in military law was the more pressing that not only did the different states of the empire have various military enactments, but, in many instances, they did not even coincide with modern ideas of retributive justice. Furthermore, it was earnestly wished that the military law of the country should approach as near as circumstances permitted to the civil code. Such considerations led, by a resolution of the cabinet of 9th October, 1871, to an imperial commission of officers and military and civil jurists, who, in the space of four months, compiled a new *Militär-Strafgesetzbuch*. After a few minor alterations, it was passed by the Reichstag, approved by the emperor 20th June, 1872, and came into force on 1st October of the same year.

From that time, therefore, the German empire has had a common military as well as a common civil code.

The *Militär-Strafgesetzbuch* for the German empire sets forth the following code of punishment:

I. Chief Punishments.

1. Death.
2. Penal servitude.
3. Restrictions on liberty.
   - *a.* Imprisonment with hard labor.
   - *b.* Confinement in a fortress.
   - *c.* Arrest.

II. Concurrent Punishments.

1. Cashiering.
2. Dismissal from service.
3. Degradation of soldiers to the second class.
4. Reduction of non-commissioned officers to the ranks.
5. Loss of civil rights.
6. Loss of office.

We see from this code that German military punishments differ little from those known in civil life. Except arrest, there is no penalty involving restriction of liberty which is not common to both codes. The concurrent punishments, however, which are mainly derived from the Prussian *Militär-Strafgesetzbuch*, necessarily differ widely from those of the civil code. Both have alike adopted the punishment of death, and a comprehensive and carefully constructed system of imprisonment and punishments of honor.

One great difference, however, exists between the two systems, namely, that the military code of punishment does not include fines. This omission is founded on the idea that military crimes and misdemeanors are of such a nature that they cannot be expiated by amercement. Paragraph 29 of the *Militär-Strafgesetzbuch*, therefore, contains an express regulation that in the case of offenses which in civil life may be punished either by a fine or by imprisonment, the latter alternative, where a soldier has committed a military misdemeanor, is alone to be enforced. In paragraph 3 of the same book, it is ordained that such punishable actions on the part of soldiers as are not military in character may be dealt with according to the common system of punishment. The soldier, therefore, is subject to two different military codes; and may be mulcted in a fine when a civil, and not a military misdemeanor is in question. The common idea that the officer has special privileges, and that the equality of all before the law does not apply to him, is absurd. It is true that he can only be tried by a military court; but, as a rule, such a tribunal would impose a heavier punishment than a civil court. If we compare the present German law of military punishment with earlier codes, or even with those of other nations, we notice that it is far milder and more moderate. The compilers of the Prussian *Militär-Strafgesetzbuch* upheld especially the truth of the old saying, "Prevention is better than cure." Insubordination, for instance, is punished with the greatest severity; though it is left to the commander-in-chief to pardon or commute the sentence of a soldier whose conduct in prison has been satisfactory. Punishment, however, has through such leniency become in many cases so trivial that no little opposition has been raised to a method in which humanitarianism is considered to have been carried to excess. In an essay on this subject, published in the *Löbell'schen Jahresberichten* three years after the regulations of the *Militär-Strafgesetzbuch* for the German empire came into force, the necessity of a revision of the military code is earnestly advocated:

"We cannot deny that such a revision is strongly desired throughout the army, and the wish seems to us well founded, although in some instances it may have been a little exaggerated and hasty. The faults alleged against the code of military punishment have one and the same origin, the desire of the framers to protect the better educated and more refined portion of our troops from unnecessary severity. Punishments, however, which are applicable to the cultivated elements are by no means adequate to keep in order the uncultivated and even criminal section of our enormous army. Military law must be strong and severe enough to hold this latter class in check. Those to whom the administration of military law is intrusted should, we think, be allowed to exercise to a certain extent their individual judgment and discretion. We earnestly hope that any revision of the *Militär-Strafgesetzbuch* will be conducted on these lines."

It has also been questioned by eminent authorities whether the regulations of the *Militär-Strafgesetzbuch* be really in the interests of discipline. A celebrated German military jurist says,—

"If the different German governments, in order to hasten the enforcement of the new military law, did not withhold their consent to the moderate counsels of the commission, it was because they believed that the court were not actuated so much by regard for the person and feelings of the criminal, as by a higher and nobler consideration of the effect which such a moderation of military law would have upon the discipline of the troops, and ultimately, therefore, on the safety and welfare of the Fatherland."

In civil cases the nature of the crime and the moral guilt of the criminal form, of course, the principal considerations. But in the case of military offenses it is otherwise. Every other consideration must be made subservient to an estimate of the injury which a particular misdemeanor may have done to the interests of discipline; and according to this estimate must the criminal be judged and punished. Even more than in civil life, punishment is intended to act as a deterrent. Death very properly forms a part of every system of military punishment, for the discipline of an army could on no account be upheld except by the influence of this last, worst, and most powerfully deterrent of all penalties. The commission, though divided on other matters and details, were unanimous in favor of this form; and even those opposed by principle to capital punishment have acknowledged that it is absolutely indispensable to the maintenance of thorough discipline in the field.

The *Reichs-Militär-Strafgesetzbuch* does not include death among the punishments for military offenses committed during peace. In war, however, it is threatened in eleven different cases, and they are the worst of military crimes: 1. Treachery in war, or withholding information of such treachery. 2. Unjustifiable capitulation. 3. Desertion of the colors in the field, in retreat. 4. Instigation to desert the colors in the field. 5. Desertion of a post before the enemy. 6. Cowardice in battle. 7. Positive refusal of obedience before the enemy. 8. Violence against superiors in the field. 9. Instigation of a military revolt in the field. 10. Participation in a military revolt before the enemy. 11. Pillaging with murder.

The greater number of these offenses are such that they would inevitably undermine the whole inner organization of an army. Death, the heaviest punishment known to law, must be the consequence of such crimes. In less aggravated cases, however, penal servitude, or imprisonment with hard labor, is often substituted for death. But the minimum of punishment is even under these heads often very small. On the other hand, deserting the colors in the field, instigation of or participation in a military revolt in the field, are invariably punished with death. The consequences both to the army and to the regiment to which the offender belongs are so grave that any other penalty would be ridiculously inadequate.

By No. 1 is understood willful and treacherous surrender of fortresses, ships of war, and arsenals; the communication of plans of operations, passwords, or any such secrets to the enemy; willful destruction of railways, telegraphs, and wagons. As these laws are operative in an enemy's country, they are applicable to any foreigner who may commit the same offenses. A soldier condemned to death on account of a military crime—and as beforesaid such a condemnation can only occur during war—is sentenced to be shot. A soldier sentenced to death during peace for a civil offense will be decapitated, although he may have been tried by a military court. In the field, however, he would in any case be shot. The last regulation is derived from the old Bavarian *Militär-Strafgesetzbuch*, and takes its origin from the fact that the appliances for decapitation are seldom procurable during a campaign. It is, furthermore, traditional in all armies that a soldier sentenced to death should die by the bullet.

For the fulfillment of such a sentence in the German army, a body of men amounting to no less than a company must be told off. A staff-officer superintends the execution, and determines in what manner the doomed man should be brought to the spot. The prisoner should be accompanied, if possible, by a clergyman of his creed. The question whether any other body of troops who may be quartered in the vicinity should attend the execution, is decided by the nature of the crime committed. When an "example," however, has to be made, such a course is generally deemed advisable. Arrived at the place of execution, the sentence, with the exception of the judge's reasons, is read out to the condemned man, the company meanwhile presenting arms. The firing-party consists of ten privates, ranged in two ranks five spaces from the prisoner. After the priest has been allowed once more to address the condemned man, the sentence is fulfilled at a word or sign from the officer in command. The latter also decides, according to the circumstances of the case, whether the prisoner should be blindfolded or bound.

Penal servitude, as in the civil code, is either for life or for a number of years, not less than one, nor more than fifteen. The concurrent punishment of dismissal from the army or the marine is its invariable result. Seventeen different military crimes, all in themselves peculiarly dishonoring, are punished with penal servitude. It may be remarked that only a small proportion of these seventeen military misdemeanors includes cases of insubordination, even when such insubordination occurs in the field. After the conviction of the prisoner, whether it be the consequence of a military or of a civil crime, he is handed over to receive his punishment at the hands of the civil authorities. As dismissal from the army or the marine is the inevitable consequence of his conviction, it is of course argued that he is no longer a soldier.

The punishment of imprisonment has been borrowed from the civil code in order to make the two systems as alike as possible. In the original draft of the *Militär-Strafgesetzbuch* submitted to the Reichstag, fortress labor was substituted for the imprisonment of the common code; whilst fortress arrest was suggested in the case of officers. But the confinement together in one fortress of officers and men was deemed unadvisable in the interests of discipline, and this plan, therefore, did not find favor with the Reichstag. Imprisonment with hard labor, consequently, was substituted for fortress labor; whilst the fortress arrest, designed for the punishment of officers, was replaced by fortress confinement. In order, however, to preserve the interests of discipline, the military code leaves it to the discretion of the court whether imprisonment with hard labor or fortress confinement (*custodia honesta*) should be enforced. In thus leaving the mode of punishment to the judgment of the court, the *Militär-Strafgesetzbuch* differs somewhat from the civil code; and this divergence was characterized in the Reichstag as a new and most important innovation in judicial procedure. Military and civil laws of imprisonment, however, are very similar in character. Some differences regarding the maximum and minimum, as well as the manner of enforcing punishment must, of course, exist,—they are the inevitable consequences of the exceptional conditions under which the military code of punishment must work. According to the civil code, the minimum of imprisonment is one day, the maximum five years. In military law the minimum is six weeks and a day, the maximum fifteen years.

The minimum for military imprisonment with hard labor has been made a large one, because minor delinquencies entail only arrest,—a punishment not known to the civil code. The maximum duration of arrest is six weeks. Crimes or misdemeanors of greater magnitude are punished with imprisonment or fortress confinement. The maximum duration of these two latter forms of punishment is identical, in order that either can be inflicted at the discretion of the court. There is, of course, a stigma attaching to the one that does not apply to the other. In the civil code such an unanimity of duration does not exist, for imprisonment with hard labor cannot be inflicted for more than five years (in the case of a concurrence of several crimes, ten years), whilst fortress confinement may last fifteen.

In regulating these different modes of military punishment, the exceptional conditions of the army had necessarily to be considered. It is apparent that during the expiation of a military misdemeanor, the training and instruction of the soldier must by no means be allowed to drop or even to be relaxed. A soldier sentenced to imprisonment must work, then, under strict military discipline, if only for the reason that a military crime should be punished in a military manner. Starting, therefore, with such an end in view, it was found practicable to retain the Prussian method of dividing military criminals into bodies in which non-commissioned officers and men follow a military occupation under the strictest disciplinary supervision. Unlike civil prisoners, they can be employed outside the prison without their own consent. An officer undergoing a period of imprisonment is employed at the fortress to which he may be taken in literary or scientific work provided him by the authorities. The different treatment of the officer as compared to that of the non-commissioned officer and private corresponds to the civil regulation that a person sentenced to imprisonment is to be employed in a manner suited to his powers and circumstances. In consequence of such an unanimity between the two codes, reforms previously contemplated by the German authorities are rendered unnecessary. It would now be possible to insert in the *Militär-Strafgesetzbuch* a clause to the effect that every soldier sentenced to imprisonment should receive his punishment at the hands of the military authorities only. In the case of penal servitude it is of course otherwise. The prisoner is dismissed the army and becomes again a civilian, subject to the civil code. It is apparent that the interests of discipline are served by the adoption of a system under which military punishment is enforced by military officials so far as possible under military conditions.

(To be continued.)

SHAM SIEGES.

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It may be assumed as universally accepted that the mimic manœuvres usual in the fall have for their object the practical application of tactics.

He who would master this game of war (of which it is to be supposed that he has mastered the elementary rules and has learned their object) must now put it into actual (though it be mimic) practice. Doubtless this is the correct conception of the October drill; but it would not be accurate as regards the sham siege, and for this very simple reason:

The campaign and its lessons are, so to speak, an open art and acquirement, a kind of general discipline; but the siege has this difficulty, that the mass and materials are gathered together into some assigned position, and must remain withdrawn from general inspection. It follows that its rules will be easy to only a very few, and the most of its exercises must be perhaps rather formal (*reglementaire*) than applied, at least in their first outlines. Given the means to a proposed objective upon certain conditions, this is the status of a modern siege.

No one can deny that much may be learned, even under such limitations, and that skill may be gained. Perhaps it may be excepted that technical dexterity is not acquired. Rather, it cannot be so fully acquired as in the open manœuvres.

The proper formation for troops on the march, their deployments, their training in firing, etc., may be mastered, and yet the officer remain a mere holiday soldier. The aim here should be higher. Could not a mimic siege, thoroughly carried out, teach something more than a merely positive knowledge of trenches and parallels, of garrison duty and of concentrated fire? There is no danger that the mere formal study of siege operations would be overlooked or thrown into the background, since it must form a part of the regular questions and of the examinations. But it is fitting that the present, or rather the future, practice of sieges should receive a thorough tactical examination, since it is, or should be, now based upon the axiom which demands that full value be given to any resistance that can be made to a given hypothesis.

The first tactical assumption, at least in actual siege operations, is this, "That the enemy will do the very last thing that you would wish him to do." Then arises the question, "What can he do? and can it be wrested to his injury, or can he be used to your advantage by means of it?" These questions demand a reply as well in sham operations as in real sieges, though in a weaker form. But by them strict rules are laid down for the two belligerents as to what they ought to do, and how they should do it, with reference to the "when" and the "where," and as to what should be left undone. It comes simply to this, that modern practice has been grafted upon Vauban's rules, and the resulting effort to combine their rigorous views with the prevailing ideas has been undervalued. Vauban's attack began, tactically speaking, where now the infantry attack takes the chain of supports, and where the strengthened fire prepares the breach. In Vauban's day the infantry attack began at nearly the same distance; while the present mode is to make the earlier preparations some kilometres off, and to push forward into the opposing range till the doubled line of supports is reached. This is the case in modern sieges. But Vauban's method did not allow the besieged so much liberty of action. What he could do, aside from what the besieger permitted, that he could and must do. So in field operations the defense had no choice of ways. "Romeward" when the attack had strengthened his advanced line. The proper distance at which to begin operations can only be confidently spoken of from a consideration of the conditions.

Does not this deserve quite as serious consideration in siege operations? The modern besieger holds the exterior unclosed spaces nearest the point selected for breaching in the same way as in Vauban's time, but at much greater distances away. And in this fact seems to be the ground why the proper formation under Vauban's theory is not the correct formation for modern operations. And on this rests the questions, which must be thoroughly examined, "Shall and must the enemy do actually and only what the attack expects of him? Can he be so forced to act that he must do only this, or can there be another way 'Romeward' forced?" Difficult as this must be to solve, yet some partial replies can be given to the most obvious points, and what study can throw more light upon them than the practice manœuvres? It must appear to every thoughtful person that the latter points can be almost as well accomplished—in many cases at least—without using the same moves. For to rely on the same series of moves would establish a fixed routine and a controlling arrangement which one would not wish to be brought into general and uninterrupted practice. This possibility exists, not merely when these moves are discussed in some treatise, but it is also almost inevitable when the moves are examined as an exercise for whose solution no authoritative treatise exists.

Hence the mimic campaigns are always arranged, as far as may be, upon a *terrain* similar to that upon which a real contest may be fought. But can the sham contest so closely imitate the actual contest that the conditions of the future battle can be worked out? Surely not. Can, in the mimic war, a single participating condition be assumed which shall be like the possible or controlling combinations, and can the parallel, secret resources and moves be known? Quite as unlikely. And yet it is possible, by good management, to shape into beneficial results a prearranged series of manœuvres, and, by a continual use of the "*hic Rhodus, hic salta,*" make the imitative nearly equal the actual manœuvres.

It can hardly be said that a sham siege can become a "*hic Rhodus, hic salta,*" but it can be fully granted that no one understands the real conditions of a siege who believes that the outcome of the contest are only technical and not by any means tactical exercises, and that the ends have been accomplished by technical and not tactical skill.

True tactical principles are less demanded in a siege where technical skill is chiefly needed. But tactics form the real protection under which the siege can be conducted, and therefore the instructive study of tactics in a siege is acquired by such studies as this, as the similar manœuvres in the field give ocular demonstration how troops should be handled in actual warfare. But since these mimic campaigns are not undertaken to acquire skill in the mere equipment or handling of troops, or for some such simple end, but to acquire skill in tactics, so it may be clearly perceived by a simple example how a similar acquisition may be the true problem in a sham siege. Let there be organized some party for this purpose, and let the "Red" occupy a position under the Plevna conditions, and let the "Blue" attempt its capture. There would be formed a very clever "*hic Rhodus, hic salta*" as a valuable practice for both sides. Probably an examination of Osman Pacha's "Memoirs" by the one party and of Todleben's by the other would result in a third and suggestive idea. Two hand-books could be used, which are neither secret nor difficult to procure,—"The Instruction on Infantry Firing" and "The Tables of Ranges" (for the artillery). If the "Red" were to place a small detail in their well-planned redoubts, then the "third" alternative would readily suggest, apart from the two authorities in hand, what could be done against them,—whether an attack could be led against them or not.

There is this very possible good, also, that this suggested "third" plan would lead to the surprising discovery that the means and arms which the "Blue" had collected, as well as those which they obtained on the spot, would not be sufficient for the capture of the redoubts, and probably not for the preparations for the siege.

Given this "leading example," notwithstanding the capture by a sudden dash, the further question remains, "What help shall the 'Blue' look for?" The third alternative would now suggest that it would be necessary to examine what and how much material for attack is necessary to break through the resistance of the enemy.

Who can deny that all this would open up interesting questions? Might not a fourth plan strike out an entirely new way of attack? And which of the plans would be the strongest, and why?

It is not necessary to carry out further the illustration. Let us set beside it a different example.

Instead of reproducing the Plevna conditions, let the "Red" be placed behind an improvised line of defenses, and supposed to hold some well-digested plans and tracings by the engineer of the "Red," when there were no such actual dispositions. Here the positions would become quite critical when the "Blue" should advance. How could they break through the lines and gain other strategic positions? It is not here indispensable to describe what useful ideas might bear examination for attacking the lines. It should be expected that plans different, yet parallel, and displaying much incidental skill, arising, if you choose, out of the conduct of the operations, would be produced. There might also arise ways of disproving the practicability of some suggested combinations. The "Blue" could now test what is actually needed, and what can be used to accomplish its aim, and whether it could effect its plans at all, or partially, or on other than the intended lines. .Would not this become a really earnest study and practice of tactics? And would not the participants, in time of peace, learn what would afterwards prove to be of greatest value? This training would enable him, in the stern contest of the real siege, to seize upon accidents and turn them to the richest account. These exercises might prove useful directly in actual sieges which the state foresees as probable, and they would supply a facility in improvising which would otherwise be thought too simple.

So a siege, when it is actually undertaken, is not very different from the rightly studied case of a patient whose valuable life the skillful physician from the outset strives to lengthen, and who endeavors by all his resources to neutralize or minimize the approaches of death. Let the physician on each side thoroughly employ all his resources. In Vauban's time the patient suffered generally from simple heart-disease, now the case is far more complicated. The pain seizes upon the extremities, while the resources for neutralizing the danger are much increased and altered. Should not deeper researches be undertaken to learn the rigorously fundamental and practical working of the means and countermeans at hand? It can be well imagined that, as the facts now stand, the two chief factors, to which the technical part of the siege is intrusted, hold but a surface relation to the tactical disposition of the forces. But the artillery and the engineer troops should be trained in tactical evolutions, as manœuvring and the like, as well as the infantry. Then, in real sieges, the technical factors can work harmoniously with the leading arm in the tactical disposition, which could then claim on its side but little exclusive privilege. It would do little harm if, in time of peace, the technical factors were to master at least the practical application of tactics, and the tactical factor should read up something of the "Tables of Ranges," and of planting batteries, and of the duties of the sappers. Were this reading on the part of the technical arm carried through the introductory study, as, *e.g.*, the "Instruction in Infantry Firing," it would be but a fresh proof that their tactical instruction is not carried out as it now is with the infantry. In this part of its training the attention given is very close and the results are marked.

Whether or not the engineer troops, considering their exhausting and exposed duties, should be required to learn artillery-firing may be questioned; but at any rate the artillery would gain if instruction were given them in the drill of the sappers.

Since each arm must extend the range of its weapons, this question, with regard to the several ranges attainable, will be often propounded, "Can this limit be surpassed by the most rapid and least costly outlay of ammunition and of time (*i.e.*, of combined weight and work) strengthened by accurate tactics?" The infantry man has the question set before him in his "Instruction in Firing;" but he has a single weapon, while the artillerist, on the other hand, must acquire familiarity with quite a varied series of weapons. He, too, has the same question often implied in his "Tables of Ranges." It will occur, as a part of his knowledge, to meet accidental cases, and it may be put as an example in the "Tables of Calibres."

Very naturally this direction is given to the foot-soldier, "This is the range of your firing, do the best you can within it." But to the cannoneer it is said, "Here is your battery and your ammunition,—grape-shot, shrapnel, etc.,—now fire beyond its range as far as you can." This substitution of shrapnel (Uebergang zum Schrapnel) will take the precedence of all other regulation practice, and the tactical side of the whole problem will be developed, mainly the final trials here indicated. It is necessary to wait for the results as to the minimum of effect against a given mark by means of the available artillery and musket practice.

It cannot be concealed that positive changes must be made. It is not possible to ask the officer of a battery, when in action, "what guns he ought to have to get the range of a given mark." But, because it is so seldom asked, this question can be suggested, "Should not the battery run the risks of exposure, rather than be crowded into the background, and then not always in proper position, at least to reply effectively, and when its full weight can be decisive?" It will be remembered how, full ten years ago, it was attempted to fight the German "Normal battery" at close dismounting range and with dismounting cannon, and with shrapnel charges, despite the opinion was adverse that the tactical operations would be enlarged by it. This one fact should not be lost sight of, that the questions we have placed above seldom, indeed, appear in the order of the day, through which it is really possible to ascertain in what cases, with the least possible loss, the battery can be most effectively handled, and where—in the first line, of course, when supported—it is most decisive.

Let us revert to the Plevna suggestion for an illustration. Let us assume that the "Blue" does not remain bound by the formulas in the hand-book on artillery practice, and should use dismounting guns, with shrapnel. How astonished the artillerists would be when the leading example made it clear, by the help of the "Tables of Ranges," that, as the attacking party, they were using the wrong missile for the object on which they were pouring their rapid shattering fire?

Let the attacking party be allowed no choice but to attack some permanent work constructed with some given material; the conditions are, out of what is possible and what is most advantageous, to decide upon the true line of operations; or, to put it briefly, hypotheses of what is desirable must be placed on a firm foundation. Such a use of sham sieges might lead to some successful results in actual sieges.

If the defending engineer should be able to improvise some good means of protecting his works from the adverse battery, should he not use it and afford the attacking artillerist the opportunity for new considerations? How would he treat each distant object? Why should not the fortress be permitted to oppose no second line of guns against the second line of the besieger's batteries, but, instead, to invent some new mode of defense? Out of the fruitless combinations of the fall manœuvres has there been no useful result?

In truth, from every point of view, decisive revolutions are taking place in many directions in the conduct of sieges. It has been enlarged but lately by the new and hardly known precise plunging fire (*das präzise Wurffeuer*), one hardly yet in use among our known resources. The study of the best tactical results could not be very difficult or exacting in practical application, in which it stood long upon the mere observance of formal regulations till it took full cognizance of the new modes of firing.

To remove mere drill, to replace formality by tactical skill, is not this the sole ground of all practical work? Let us bring forward this foundation for sham sieges, the "then," "when," and "where," so that no longer continued reliance can be placed on formal rules. The sham siege should not be relegated to the care of the awkward squad. To the skillful player it presents problems of ever-increasing difficulty, and such research helps to put it into tactical shape. Tactical shape! Can enough be done in this? This is the question which commands attention, and will become urgent in siege operations, which suffer least harm when it is thoroughly studied.

MODERN CRUISERS.

BY NAVAL CONSTRUCTOR THEODORE ALBRECHT, AUSTRIAN IMPERIAL NAVY.

(Translated from the German by Lieutenant W. H. BEEHLER, U. S. Navy.)

THE peculiar nature of naval warfare necessitated, from the oldest times, the division of naval vessels into two distinct classes, battle-ships and cruisers. The first, latterly known as line-of-battle-ships, were built and armed with a special view to cope with similar hostile battle-ships and to destroy an enemy's sea-coast defenses.

The cruisers, on the other hand, were designed to attack distant and less protected places, to prey upon an enemy's commerce in distant seas, to protect and convoy their own merchant-vessels, to assist in the defense of colonies, and frequently to act as reconnoitring vessels for the fleet of battle-ships. The two most essential requisites were that cruisers should be able to carry sufficient stores to keep at sea for the greatest possible length of time, and to possess high speed. The quality of great speed was by far the most important from the general nature of the service required, and no pains were spared to attain this object. None but a swift cruiser could act as a reconnoitring vessel, especially as the accurate information which was thus reported regarding the strength and position of the hostile fleet often led to the decision for battle.

Naval history records the most brilliant achievements of cruisers and privateers, especially in the engagements at the beginning of this century. England's maritime supremacy cannot be ascribed to the great naval battles so much as to the successful results of her numerous cruisers in all countries, by which English commerce and colonies were nourished in the most flourishing manner.

The introduction of steam modified naval warfare in many respects, but the necessity for the two classes, battle-ships and cruisers, remained as apparent as ever. However, it must be admitted that at no period did naval ship-building result so unsatisfactorily as when steam was first introduced. It was difficult to dispense with the long-accustomed use of sails for the chief motive power, and this indeed was well-nigh impossible, because of the enormous weight of the clumsy engines, the immense consumption of coal, and their very slight efficiency. A sea-monster was then produced incapable of carrying sufficient supplies, and which when under sail was surpassed by all sailing-vessels, and under steam could not overtake any steamer. These wooden line-of-battle-ships and frigates with auxiliary engines never had an opportunity for trial in any great war, and if they had had, their cruising operations would have been most unfortunate. These facts led to further efforts for the development of the cruisers up to the first period of armored ships, when new views were adopted, and it was thought that thereafter navies should only consist of armored ships. All workshops were then brought into requisition to build armored ships, while the cruisers were for the time being forgotten, as if there were an unlimited trust in the efficacy of international law to insure respect for the neutrality of private property on the high seas, which would either dispense with swift cruisers or limit their usefulness considerably.

"The Alabama," which inflicted such enormous injury to American commerce, and the appearance of the swift blockade-runners in the same war, again proved the necessity for swift cruisers. The American navy was at that time the very best, but as a rule the regular naval vessels were unable to prevent the swift blockade-runners from running by altogether, and fast, purchased steamers only were able to capture the daring blockade-runners.

This experience determined the Americans to build new vessels which should possess the necessary qualities for efficient cruisers, and the essential features then proposed remain the fundamental principles up to the present time. The plans then defined that the cruiser should be of moderate size, with a light armament; to have when under steam greater speed than the fastest battle-ships and merchant steamers; her boilers, engines, and ammunition only protected by being below the water-line; with a moderately large capacity for stores, and finally to be able to sail fairly well.

With characteristic impulsive energy the Americans undertook the construction of this type of cruiser, which resulted in the "Wampanoag" class, of four thousand tons displacement and sixteen knots speed, large coal capacity, fine sea-boats with good sailing qualities, and, besides, a comparatively powerful battery. But this class was not strictly successful. The wooden frames of these ships were too weak to withstand the great strain; they were completely filled with boilers and machinery, and there was no room for the water and provisions for the crew, and then the ships were so heavily laden that the desired speed could scarcely have been maintained.

Notwithstanding the failure of the Americans, the building of these ships was carefully and anxiously studied in Europe, and the construction of cruisers was finally commenced in all countries following the general principles of the "Wampanoag." In England the "Inconstant," of six thousand tons and seven thousand three hundred horse-power, was laid down in 1866, and on her trial trip fulfilled all the conditions which were stipulated for the "Wampanoag," except in her size. The "Inconstant" was followed in England and France by a number of similar vessels with speed of from fifteen to seventeen knots. The other maritime powers of Europe followed the example.

With due regard to the value of great speed and handiness, efforts were directed in the construction of new cruisers to increase the strength of the machinery and reduce the size of the ship. These efforts finally resulted, in 1877, in building the English ships "Iris" and "Mercury," each of three thousand seven hundred and thirty tons displacement, seven thousand three hundred horse-power, and eighteen knots speed. A decided improvement will be noticed by comparing these vessels with those built ten years previously, viz., those of the English type "Inconstant" and the French type "Duquesne." The horse-power remained about the same, with the engines, boilers, and ammunition protected by being below the water-line, but with an increase in the speed of two knots, from sixteen to eighteen, while the displacement was reduced to nearly one-half. This result was attained owing to the great improvements in engine-building, and the introduction of steel as a material for ship-building. The "Iris" type are armed with four 6-inch breech-loading, high-powered rifles, six 64-pounders, two light guns, and eight rapid-firing guns. This seems to be rather a light battery, but in considering the nature of the service for which she was designed, as a dispatch boat or a fast cruiser, this armament is satisfactory.

The development of the battle-ships in the meanwhile was subject to many changes, as suggested by the experience in the American war and the battle of Lissa. The development of ordnance also progressed, and with much greater rapidity. The contest between ordnance and armor became of the first consideration. The improvements in the accuracy and penetration power of ordnance demanded a continual increase in the thickness of the armor, so that in building armored vessels they were made larger and at continually increasing expense, and the space protected by armor was gradually diminished.

The completely armored battle-ships were followed by casemated vessels, with armor on the casemate and belt, leaving the extremities unprotected; these in turn by citadel ships without any armor on the sides, and finally by the ships of the "Italia" class. While the armor on battle-ships was thus being gradually lessened in its distribution, the cruisers were being provided with light armor to protect their vital parts from the destructive effects of shell and rapid-firing cannon.

These considerations naturally led to the idea of uniting the properties for battle-ships and cruisers in a single ship, and we find a practical result in the great Italian ships "Italia" and "Lepanto." These vessels are of fourteen thousand tons displacement, and have a draught of thirty-three feet. Their size renders them unhandy, their draught limits their cruising, except in very deep channels, and their immense cost all contribute to make them unsuitable types for cruisers.

The idea of giving additional protection to the vital parts of cruisers, beyond having the boilers, engines, and ammunition below the water-line, was first proposed by the English Admiralty in 1871, but the Russians were the first to apply it practically. The Russian armored cruiser "General Admiral" was launched in 1873. She has four thousand six hundred tons displacement, and a heavy battery, without any side armor worth mentioning. The ammunition-rooms, boilers, engines, and steering apparatus are protected by a girdle armor six inches thick, which is secured on its upper part to a strong plated deck. The coal capacity is very good and her seaworthiness excellent, but the speed is only thirteen knots an hour—entirely too little for a cruiser.

The critic would be disposed to regard this vessel as a battle-ship, but she is really a cruiser, with greater defensive powers than would be generally possessed by an unarmored cruiser. In Russia the "General Admiral" is considered as the representative of a most valuable type of ship, and new vessels are being built of the same type, in which certain faults of the "General Admiral" will be corrected, among which is her low speed. The newest of these Russian armored cruisers is the "Wladimir-Monomach" (1884), which shall have a speed of 15.4 knots, a very good result, but nevertheless still too small for a modern cruiser, especially as there exist battle-ships which can steam sixteen and one-half knots, and merchant steamers which for days steam at the rate of from eighteen to nineteen knots per hour. As has been usually the case in copying from an accepted type with improvements, the new ships have always been larger than the original type, so that, while the "General Admiral" still had a reasonable displacement of four thousand six hundred tons, the new vessels were upwards of one thousand tons larger; this would have been pardonable if a speed had been attained of from seventeen to eighteen knots.

All the Russian armored cruisers are designed to be good sea-craft. They are heavily rigged, and their iron hulls are completely sheathed with wood and sheet-metal skin to make them more efficient for service in distant seas. The value of sail-power for cruisers is frequently underrated, yet it is important both in peace and in war. In war, no matter how great may be the coal capacity of a cruiser, it may frequently be advisable for her to arrive at some distant station with a complete supply of coal on board; and in peace, economy and the demands of discipline and instruction are sufficient reasons for having sail-power.

The wooden sheathing over the solid iron hull is of doubtful advantage. It cannot be of any use in strengthening the ship, and the effect of such a combination of wood and iron is to increase the corroding effect of rust on the hull. But, on the other hand, the normal speed can only be maintained as long as the bottom is clean, and the wooden sheathing will thus obviate the necessity for frequent docking, which might not be obtainable in distant seas.

The above-described type of lightly-armored cruisers has not been followed except in Russia; but the other maritime powers possess a number of armored vessels, designed for service in distant seas, in whose construction certain definite qualities of the battle-ships have been sacrificed. Among such we find the English "Nelson" type and those after the French cruiser "Turenne." These vessels are, however, with more or less reason, classified as armored battle-ships.

In the construction of cruisers proper the protection of the vital parts was decided to be sufficient by a comparatively thin deck instead of the thick side-armor, and in nearly all navies armored-deck cruisers are in existence to-day. The first ship with an armored deck was the English corvette "Comus," launched in 1878, and which has a speed of thirteen knots. The armored deck extends below the water-line, over boilers, engines, etc., and is but 1.45 inches thick. The extremities are unarmored. The coal-bunkers are so arranged that when full they give additional protection to the engines and boilers.

It was then sought to combine the advantages of the "Comus" type with the highest speed obtained in the "Iris," and the result was the English "Leander" type, of which there are now four vessels afloat, and they may be considered the most efficient vessels in the English navy to-day. These vessels are built entirely of steel, and have three thousand seven hundred and fifty tons displacement, three hundred feet long, forty-six feet beam, nineteen feet eight inches draught, twin screws, with six thousand indicated horse-power. When fully loaded, and by using artificial draught in the fire-room, these vessels have a speed of seventeen knots. Their armament consists of ten long, high-powered 6-inch breech-loading rifles, two light guns, and six Nordenfeldts. The coal-bunkers are so arranged that the coal will protect engines and boilers on the sides and from on top, and they will contain seven hundred and fifty tons, but the total coal capacity amounts to one thousand tons. With the last-mentioned supply they can steam two thousand miles at full speed, and ten thousand miles at ten knots. These vessels also have full sail-power, and, notwithstanding their twin screws, are quite handy vessels. The engines and boilers are placed below the water-line, protected by 1.5-inch steel deck and the coal in the bunkers. The ammunition-rooms are protected by a somewhat thinner deck. The extremities are unprotected.

In the United States absolute necessity has compelled the Americans to improve their navy, and they decided to follow a modified type of the "Leander" for their new cruisers. The "Chicago" has a hull like that of an armored cruiser, and is somewhat larger than the "Leander" class, while the "Atlanta" is somewhat smaller. The relative proportions are, however, the same in all. The "Chicago" has a displacement of four thousand five hundred tons, and is to have an armament of four 8-inch and ten 6-inch guns. The "Atlanta's" displacement is three thousand tons, and her battery two 8-inch and six 6-inch guns. Nothing definite can be said about the speed of the American cruisers until after their trials.

The system of armored decks for cruisers was derived from the citadel ships, in which they were first employed to protect the unarmored portions forward and abaft the citadel. In these vessels the deck was placed as a rule below the water-line, and formed a water-tight cell by its inclosing protection, while water-tight compartments were built upon it up to the light load line, or even to the spar-deck. This armored deck offers great resistance to projectiles from its nearly horizontal position, and by having the small, narrow compartments above it filled with coal, sails, hammocks, etc., there was little risk of having this armored deck overflooded to such an extent as to endanger the buoyancy of the ship. If, however, the compartments above an armored deck (which is below the water-line) were entirely demolished in an engagement, the ship would undoubtedly sink. The possibility of such a catastrophe is, however, even in a citadel ship very slight, and in a cruiser not worth consideration, since her high speed would enable her to avoid engagement at such close quarters where such could only be possible.

All the previously-mentioned cruisers only have partially armored decks, which extend from a water-tight bulkhead in the bow over the boilers and engine to a water-tight bulkhead in the stern, while the extremities are not protected. The limited space thus protected has weak points on each end, because the thin bulkheads, placed vertically, can offer no resistance to projectiles, and but little can be gained by backing them with coal and other stores. In order to utilize all the advantages of an armored deck it should completely inclose the ship, and divide it into two separate water-tight compartments, the protected under body from the unprotected upper body. Such a ship would in a case of damage at the water-line have a greater intact displacement, and overcome the objection to the weak extremities in a ship with partially armored deck. Such a complete armored deck would, by extending to the stern-post, protect the steering-apparatus, and at the forward end could be brought down to the stem to give additional strength to the ram.

A complete armored deck was first introduced in the Austrian steel gunboats of the "Zara" type. And though the practical results of these ships were not equal to what was expected, yet in proportion to their size, from eight hundred and forty to one thousand tons displacement, they are up to the present time the most solid of all armored deck cruisers. In these vessels the armored decks extend from the stem to stern-post, and are water-tight throughout. The deck consists of two welded layers of three-quarter inch steel plates, which are secured to the frame on the sides at three feet three inches below the water-line. At the forward end the deck goes to about five feet below the water-line, and ends as a strong brace to the stem. The deck completely covers all the space below it, including the magazines, the engines, boilers, and the steering apparatus. The armored deck has no beams, but carries itself by its shape and thickness. A complete cellular construction is built upon this deck, with longitudinal and athwart-ship bulkheads covered by an upper deck, so as to divide the space, from the armored deck to a height of one foot above the water-line, into sixty-four water-tight cells. These cells have each a cubic space of from fifty to one hundred and twenty-five cubic feet; these are filled with coal, provisions, stores, and hammocks. The underneath portions are also divided into ten water-tight compartments, in order to give some protection against torpedoes.

Wherever the importance of the horizontal protection to the vital parts of a ship has been properly considered, it has been decided to introduce complete armored decks instead of partial decks in new cruisers. The best example is given in the yet unfinished French cruiser "Ifax," of four thousand five hundred tons displacement, which has a fore and aft armored deck 1.6 inches thick, upon which there is a cellular construction which extends to the gun-deck. This vessel completely satisfies all the conditions of a modern cruiser in every particular. Her battery consists of long, high-powered 6.3-inch and 5.5-inch rifles, the most effective guns for the special service as a cruiser.

The sail-power is sufficient for use under sail alone, while the wooden-sheathed iron hull covered with copper renders her independent of the necessity of docking, as designed for the Russian ships. The speed of the "Ifax" with forced draught will be from sixteen and a half to seventeen knots, and by using picked firemen and selected coal her speed will be eighteen knots, with a weight of engines of nine hundred and seventy-five tons.

Recently a new type known as ram cruisers has been introduced, the first ship of this type having been constructed by Sir W. Armstrong, at Newcastle, for the Chilian government, named the "Esmeralda."

The "Esmeralda" is two hundred and seventy feet long, forty-two feet beam, and, with four hundred tons of coal and all her stores, her draught is eighteen feet three inches, and displacement three thousand tons. She is built entirely of soft steel, and carefully divided into water-tight compartments. When compared with the French cruiser "Ifax," we find that her hull is not sheathed with wood, and that she has no sail-power worth mentioning.

The strongly-welded armored deck is amidships, one foot below the water-line, while at the side it extends to four feet below. It extends from stem to stern, and at the stem forms the abutment for the ram, but it is only one inch thick.

A cellular construction is built upon the armored deck, which is seven feet high amidships, and has the cells along the sides filled with compressed cork. For additional protection the spaces over the engine-room and boilers are fitted for coal-bunkers. Above this cellular construction there is a light, airy berth-deck. The spar-deck carries the battery, and it is eleven feet above the water-line. The battery is very heavy, and consists of two 25-ton 10-inch and six 4-ton 6-inch long, high-powered breech-loading rifles. On the bridge there are two 6-pounder Elswick system rapid-firing guns, and besides a number of Hotchkiss and Gatling multifire guns. The two 10-inch rifles are mounted in pivot amidships. One is sixty-five feet abaft the stem, and the other an equal distance forward of the after-end.

The axis of the bore of the pivot-gun is sixteen feet above the water-line, and each has a sweep through an angle of two hundred and forty degrees of the horizon, so that at a distance of fifty yards the fire of the two pivots will cross. The upper deck has no bulwarks which might interfere with their line of fire, but is there simply fitted with light movable railing. This deck will necessarily in rough weather be washed by the seas; but this could only in exceptional cases interfere with the working of these pivots, which are besides surrounded by a circular combing about three feet high. Each gun-carriage is also fitted with a steel shield for protection against multifire projectiles.

In order to load one of these guns it is necessary to train amidships, with the breech towards the chute placed in steel loading-house on the upper deck. The charge is passed out through the pipe in the loading-house. The lifting of the projectile and the charge can be done by the hydraulic apparatus or else by hand.

Between the two pivot-guns the upper deck has a high bulkhead, in which the six 6-inch guns are mounted on pivots in projecting half-turrets. Each of these guns has an angle of fire of one hundred and thirty degrees, and is provided with a steel shield attached to the carriage for protection from multifire projectiles. The 10-inch rifle, with a charge of two hundred and thirty pounds of powder and a projectile of five hundred and thirty-six pounds, has at the muzzle a penetration of twenty-two inches of iron, while the 6-inch guns penetrate eleven inches of iron.

The bridge is in the centre of the ship, and contains the pilot's house, which is built of steel two inches thick, and contains the steering-wheel and signal standards for communicating by telegraph to all parts of the ship.

The "Esmeralda" has two steel masts, with short signal-poles. A revolving cannon is placed in each of the large tops, while an electric-light projector is fitted on the foremast.

The twin screws of the "Esmeralda" are driven by two independent compound engines. The cylinders are not placed exactly horizontal, but inclined to utilize the space under the armored deck. Steam is supplied from four double-ender boilers, which give four separate fire-rooms and two smoke-stacks. The mean speed obtained on a run of eleven miles was at the rate of 18.28 knots per hour on two trials with full power, and when the "Esmeralda" was fully loaded with stores. This trial proved that she is the fastest sea-going man-of-war afloat. The normal coal capacity is four hundred tons, but by utilizing the space between the armored deck and berth-deck she can carry six hundred tons. She can steam a distance of six thousand miles at ten knots and eight thousand miles at eight knots.

The "Esmeralda" is the first large ship which belongs to the so-called ram cruiser class, although the smaller and slower Chinese cruiser "Tsi-Yuen" should also be so reckoned. The New Castle firm has just completed a second similar ship, which is somewhat longer, the "Giovanni Bausan," for the Italian government. There are, besides, two for the Japanese government building, somewhat larger. In these last the weakest point in the "Esmeralda," the thickness of the steel deck, is improved by making it three inches thick. The maximum speed for the Japanese vessels is put at twenty knots. In Italy three ram cruisers similar to the "Giovanni Bausan" have been commenced. At Triest there is one of this type, the "Patagonia," now building for the Argentine Republic, and at Toulon a similar one for Japan.

The construction and trial of the first ram cruisers have revived the question as to the necessity of side armor against modern ordnance. The "Esmeralda" is, indeed, a formidable vessel, and of her kind she is the most perfect that our present means could produce; but as to her exact value as a war vessel different opinions are expressed. While some claim the "Esmeralda" to possess every desirable feature for a man-of-war, others assert that in a contest with a heavily-armored vessel she would soon be destroyed. Sir Edward Reed and Sir William Armstrong find themselves bitter opponents. The former advocates the armored battle-ships, while the latter considers the ram cruiser to be the battle-ship of the future. The opinions of these distinguished gentlemen are not, however, conclusive nor disinterested. The former, Sir E. Reed, is the most celebrated constructor of armored ships, while the latter is a leading member of the firm which has made a specialty of building swift cruisers.

The idea of abandoning all vertical armor for ships, and to convert all into heavily-armed ram cruisers, has, especially in England, many advocates. Just as when armor was first introduced it was rashly advocated that all unarmored vessels should be considered unfit for battle. But from the English stand-point the outbreak of war would require many more naval vessels for the protection of her immense commerce and her rich colonies. And when one reflects that three formidable ram cruisers might be built for the same cost as one huge armored vessel, the argument seems very strong, still further enhanced by the probabilities that three ram cruisers would be more than a match for any ironclad, while their efficiency in the protection of commerce and distant colonies would be at least threefold as great. The supporters of the armored vessels, however, claim that the three rams would be totally destroyed by the shell fire, from which they are not protected.

There is truth on both sides of the question, and probably no admiral would allow a vessel like the "Esmeralda" to quietly watch a battle without participating in the engagement. But in a battle-ship the guns, the crews, and the ammunition supply need quite as much protection as engines and boilers, for their integrity in battle is as important and necessary as the under-water body of the ship.

While the "Esmeralda" is doubtless a master-piece of modern science, she does not fulfill all the conditions for a man-of-war. As a cruiser she is offensively unnecessarily strong; and, on the other hand, as a battle-ship she is defensively too weak. The system which she represents—a small, solid, fast ram, with fore and aft armored deck over boilers, engines, magazines, and steering apparatus, and a heavy battery to sweep the entire horizon—are all requisite qualities for battle-ships of the future, with certain modifications for the protection of the guns and the supply of ammunition. For the conversion of the "Esmeralda" into an efficient battle-ship it would be necessary to increase the thickness of the armored deck to at least two and three-eighths inches compound plate, and to protect the turrets and ammunition shafts by vertical armor of compound plates of from eight to ten inches thick. Such a vessel, with four thousand five hundred tons displacement and twenty knots maximum speed, would be a formidable battle-ship.

Two of such ships could confidently risk an encounter with any armored vessel of the present time. Indeed, one would not be an unworthy antagonist, for by her superior speed she could choose her own position and time in any encounter.

So it may result that the ram cruisers, which to-day are half-way between battle-ships and cruisers, may develop into the battle-ships of the future. But the probability of building a vessel which shall fulfill all the requirements of a cruiser as well as those of a battle-ship is even more remote than ever, and growing requirements for each class will make the production of such a ship ever more and more difficult.

The following is a list of all unarmored cruisers in the navies of the world which have a speed of fifteen knots and upwards. The speed here given is the maximum ever attained under the most favorable circumstances. Vessels with fourteen knots speed are too numerous for mention in this connection. There are but few cruisers which are considered efficient with less than fourteen knots speed under all circumstances.

This list is taken from the files in the Office of Naval Intelligence at the United States Navy Department:

	Date of Launch.	Displacement. Tons.	Speed. Knots.
GERMANY.			
Prince Adalbert	1876	3925	16
Bismarck	1877	3925	16
Sophie	1881	2169	15
Hohenzollern	1876	3000	16.3
Blitz	1882	2700	15
Pfeil	1882	2700	15
Qieten	1876	2350	16
ENGLAND.			
Polyphemus (armored)	1881	2640	16
Hecla	1874	1760	15
Inconstant	1868	5780	16
Raleigh	1873	5640	16
Shah	1873	6250	15
Iris	1877	3730	17
Mercury	1878	3730	18
Amphion	1883	3750	16
Arethusa	1882	3750	16
Leander	1882	3750	17
Phæton	1883	3750	17
Mersey	......	3550	17
Severn	......	3550	17
CHILI.			
Esmeralda	1884	1500	18.28
CHINA.			
Sang-Onei	1881	1350	16
Tshai-Yong	1881	1350	16
Tsi-Yuen	1883	2355	15
FRANCE.			
Tourville	1876	5522	16.8
D'Estaing	1879	2236	15.3
Duguay Trouin	1877	3289	15 9
Du Petit Thouars	1874	1931	15
Nielly	1880	2257	15.2
Roland	1882	2268	15.2
Sané	1870	1915	15
Seignelay	1874	1915	15
Eclaireur	1877	1658	15

	Date of Launch.	Displacement. Tons.	Speed. Knots.
Hirondelle	1869	1036	15
Duquesne	1876	5522	16
Laperruse	1877	2286	15
Villars	1879	2268	15
Ifax	1885	4500	17.5
HOLLAND.			
De Ruyter	1880	3160	15
Van Speyk	1882	3160	15
Doggersbank	1884	3160	15
Leuwarden	1882	2030	15
ITALY.			
Cristoforo Colombo	1875	2290	16.8
Flavis Givia	1881	2538	15
Amerigo Vespucci	1882	2538	15
Sarvia	1883	2538	15
Staffeta	1876	1510	15
Rapido	1876	1450	14.9
A. Barbarigo	1878	660	18
M. A. Colonna	1879	660	16
S. Veniero	1884	660	15
A. Provana	1884	660	15
Giovanni Bausan	1884	3200	17
RUSSIA.			
Two building now of	......	2950	15
JAPAN.			
Tsukuski	1883	1500	17

The "General Admiral" class are strictly battle-ships.

FRANCE AND CHINA.

It is a characteristic of the advanced stage of civilization at which we have arrived that one nation should consider itself justified in entering upon hostilities against another without acknowledging the existence of a state of war. The latest example of this peculiar sophistry—which, it is needless to say, sets all international law at defiance—is to be found in the attitude assumed by the French government towards China. Not content with refusing to acknowledge her rights to the suzerainty which she has exercised over the kingdom of Annam from time immemorial, France deliberately entered upon hostile operations against places known to be occupied by Chinese troops, and then, seizing upon the pretext of a breach of faith on the part of the commander of an isolated garrison, demanded an indemnity which she could not suppose for a moment would be paid.

The refusal to pay it was then taken advantage of to make reprisals, which can only be regarded as open acts of war, and by so doing France has done her best to retard the settlement of the Tonkin question indefinitely.

It is difficult to believe that in undertaking such operations as the bombardment of the Foochow arsenal, the occupation of Kelung, and the blockade of the Formosa coast, the French government can have really supposed that the Mandarins would be intimidated into paying the indemnity demanded. The slightest knowledge of the Chinese and the modes of thought by which their rulers are influenced, must make it pretty clear that the measures adopted by France to enforce the claim were by no means calculated to attain that end.

Prior to the last Chinese war, when a joint Anglo-French expedition dictated their terms at the gates of Pekin, there may have been some excuse for failing to recognize the only influences that may be expected to prevail with the Celestial government. But the history of that expedition, and access to the instructive state papers brought to light by the capture of Sinho and the Summer Palace, might, we should have supposed, have sufficiently shown that there is one course alone by which the Chinese government are to be effectually coerced. And this course is, to seriously threaten the capital.

The comparatively rapid and complete success of the operations undertaken on the occasion referred to was exclusively due to the appreciation of this fact by the English and French governments of the day, and it is all the more curious that France should now be found resorting to such feeble expedients as the minor operations undertaken last autumn by her fleet.

However this may be, the objects she has in view are the rehabilitation of her prestige in the East and the complete renunciation by China of the right she claims over Tonkin as the suzerain of the Annamite rulers. There is no doubt or question as to the validity of these rights, which have been asserted on more than one occasion during the last few years, without any active interference on the part of France. As lately as 1880, on the occasion of a rebellion in Tonkin, the Emperor Tu Duc sought assistance from China, and troops were sent to assist him in quelling it. In recognition of the help afforded on that occasion, so soon as order had been re-established, Tu Duc dispatched a mission with presents to Pekin without giving rise to more than a formal protest on the part of the French minister.

The result of this was to strengthen the position of China, not only in her own eyes, but also with the state that thus ostentatiously confirmed its dependence upon the emperor. The prestige of France suffered in proportion as that of China was enhanced, and practically left only two alternatives open to her. Either she must acquiesce in the declared dependence of Tonkin to the Celestial Empire, or assert her own claims under the treaty concluded by her with the emperor of Annam in 1874.

By this treaty France obtained a virtual protectorate over Tonkin on condition of the evacuation of the delta by her troops, the Red River was made free to navigation as far as Yunnan, and the three principal towns of Hanoi, Thin Nai, and Ninh Hai were opened to commerce, and a French consul allowed to reside at each of them.

In 1881 the bolder of the two courses was decided upon, and credit voted for an expedition to support the demand he was instructed to make for a more definite treaty with Annam. In the mean time the Chinese authorities, both at Pekin and in Tonkin, steadily refused to acquiesce in the idea of a French protectorate, or even in the Red River being opened to European commerce. This state of affairs encouraged the population of the Tonkin delta, and more particularly the Black Flags, who are armed marauders of Chinese origin, to assume a hostile attitude towards the French, and early in 1882 the consul at Hanoi made an urgent demand for support against them.

Mons. le Myre de Vilers, who was then governor of Cochin China, while acquiescing in the necessity for dispatching a force to insure his safety, fully recognized the complications and difficulties which must ensue from a resort to force, and boldly maintained that the interests of France would be best advanced by the exercise of moderation. But, unfortunately for France, with the sailing of the expedition his control over its conduct came to an end, and its commander, Rivière, interpreting his mission rather by the spirit he knew to prevail in government circles at home than by the instructions he had received at Saigon, opened his proceedings at Hanoi with an arbitrary demand for the transfer of the forts situated in the delta to French hands, and the withdrawal of the Chinese troops from Tonkin.

Matters now became serious; anarchy prevailed in the delta itself; while China reinforced the northern garrisons in Bac-Ninh and Sontay with troops from Yunnan. Reinforcements were hastily dispatched to Rivière, who was closely beleaguered in Hanoi, and he shortly afterwards fell the victim to a panic during a sortie from that place, which it had become necessary, for the security of the garrison, to undertake. General Bouët was now appointed to command, and reached Hanoi the middle of 1883. His first act was to place the town in a thorough state of defense and strengthen its garrison by withdrawing to it some of the least necessary posts elsewhere, and he then awaited the reinforcements which were on their way from France. Before their arrival he was closely pressed, and forced to make a sortie in which his small force suffered severely. In other parts the progress of the French arms met with more success, Hai Dzuong, Phu Binh, and the sea-port of Quang Yen being captured.

With the arrival of the reinforcements—to the strength of seven thousand—a new departure was taken by the bombardment and occupation of Hué, and a fresh treaty was forced on the court of Annam, by which the French protectorate was recognized, and possession of the forts on the Hué River and in the Tonkin delta secured to France. The remonstrances of China, through the Marquis Tseng, were altogether disregarded, and orders were given for vigorous action to be taken in Tonkin.

In September Admiral Courbet assumed command there, having at his disposal about nine thousand men with fifty guns. In December he advanced upon Sontay with five thousand men by way of the river, and, after landing in the vicinity of the town, his force experienced very severe fighting in its environs, some of the stockades being held by the Black Flags against all assaults. The enemy, however, subsequently wore themselves out by repeated night attacks upon the positions taken up by the French, and, finding their efforts unavailing, they retired, and the capture of the town was effected with comparative ease. The French losses were not inconsiderable, amounting in all to eighty-three killed and three hundred and nineteen wounded. The enemy, in fact, proved a by no means despicable foe, and, but for the assistance derived from the flotilla with its heavy guns, the attacking force would have had their work cut out for them.

A garrison of one thousand men was left at Sontay, and Courbet returned to Hanoi, where he was relieved from the command of the land forces by General Millot in February of last year. Further reinforcements had been dispatched from France and Algeria, which raised the forces at his disposal to sixteen thousand men. Operations were now organized against Bac-Ninh, and in March two columns were moved upon it from Hanoi and Haizuong respectively. The place was occupied without serious opposition; the garrison—estimated at twenty-two thousand—was scattered over a wide area of defenses, and, perceiving their retreat threatened by a turning movement made by one of the columns, they took to flight.

The capture of Bac-Ninh was followed in April by that of Hong-Hoa, situated above Sontay, not far from the junction of the Black River with the Red River, which was effected without difficulty.

The Chinese government had notified previously that the occupation of any one of the three towns—Sontay, Bac-Ninh, or Hong-Hoa—garrisoned by their troops would be regarded as a *casus belli*. Now all three were in possession of the French; but though the relations between the two countries were consequently very strained, the situation, contrary to expectation, was found to admit of a satisfactory settlement.

Early in May the Tientsin Convention was negotiated between Captain Fournier and Li Hung Chang, and by its provisions secured France in the possession of all the advantages she had gained. China undertook to withdraw her garrisons from Tonkin, to respect the treaties, both past and prospective, enacted between France and Annam, and to permit trading operations to be carried on across the frontier with her southern provinces of Yunnan and Kwang-Si. In return, France undertook to respect the Chinese frontier contiguous to Tonkin, abandoned any claim to an indemnity, and bound herself not to prejudice the prestige of China in the arrangement of a treaty she was to conclude with Annam.

By this convention, which was subsequently ratified at Pekin, France had gained everything she had been contending for, and might congratulate herself on the substantial advantages obtained being worth the considerable outlay in men and money which they had cost her. At the moment, however, when everything appeared to be definitely settled, and after arrangements had been made for the embarkation of the bulk of the expeditionary force on its return to France, an incident occurred which, owing to the precipitancy of those in authority, reopened the whole question.

A small column of French troops having been pushed forward from Bac-Ninh to occupy Lang-son, a town garrisoned by Chinese troops, found these still in possession, and having insisted in attempting to force its way in, in spite of the remonstrances of the Chinese commander, suffered a repulse, and was forced to fall back and await reinforcements. How far the Chinese were to blame for this unfortunate occurrence may be open to argument; but there can be no doubt that the Chinese government were prepared to act up to the treaty of Tientsin, and there was nothing in the situation to render a satisfactory arrangement impossible.

But France would not hear reason, and, not content with inflicting punishment on the Chinese troops implicated, she demanded an impossible indemnity. On this being refused by the Tsong-li-Yamên, she withdrew her minister from Pekin. In accordance with ordinary international usage, it was supposed that this step would necessarily be followed by a formal declaration of war. Instead of this the French government entered upon a course of reprisals, which was commenced early in August by the bombardment of Kelung, in Formosa, and subsequently by its occupation. This was followed by the bombardment of the Foochow arsenal and the forts on the river Min, and eventually a blockade was established of the northern portion of the Formosan coast.

By the adoption of these half-measures she has only succeeded in putting China on her guard without seriously injuring her. From all parts of the vast empire troops have been moved for the protection of its more vital points, the forts and other defensive works have been completed, guns mounted, channels blocked, torpedoes laid down, and every other measure taken which can in any way increase the difficulties of a French advance upon Canton or the northern capital.

In short, the bombardment of Foochow has been the signal for the passing of the "fiery cross," and the measure of French capabilities has been estimated by her restricted action on isolated and materially unimportant points of the empire.

In the mean time, for months past, the troops in occupation of the Tonkin delta have been inactive from the lack of reinforcements, those received from time to time from France not being sufficient to fill up the gaps caused by the sickness which has been prevalent among them. At last the French government has been awakened to the necessity of more serious operations; and though they still refrain from entering upon a *boná fide* war with China, steps are being taken to dispatch a sufficient force to Tonkin to allow of the expulsion of the Chinese troops which are still in possession of the northern portion of the country. That this will be successfully effected during the coming spring there can be no doubt; but if any proof were wanting in condemnation of the action of the French government in regard to the Bac Lé affair, surely it is to be found in the actual situation.

In June last it was in the power of France, by a little patience and common sense, to have gained the undisturbed possession of the delta, and to have entered upon a policy of conciliation combined with the introduction of a system of administration suited to the condition of the inhabitants. Had this course been adopted, there is good reason for believing that the country would have become gradually pacified; and, with restored confidence, both internal and external trade would have been renewed and extended. Even in spite of the unsettled state of the country for some years past, consequent upon the warlike operations carried out by the French, and the devastating presence of large bodies of Black Flags collected to oppose them, the increase of trade at the ports opened in accordance with the treaty of 1874 has been very marked.

Taking the town of Haiphong alone, which is the port of Hanoi, we find that the shipping which entered and cleared from there was more than doubled during the three years between 1878 and 1881. There is, in short, no disputing the fact that the immediate result of the altered condition of affairs in Tonkin, in spite of every disadvantage and determined opposition on the part of China to offering any facilities for opening up trade with her southern province of Yunnan, has been favorable to commerce.

How much more so might it have become by now, had the settlement effected nearly nine months ago been carried out, and an honest attempt made to follow up the military occupation of the country by a restoration of confidence, which can alone be the forerunner of commerce. The opening up and improvement of communications and the repression of the piratical bands that infest the inland waterways of the province would have been gradually preparing the way for the time when the natural and really important trade-route from southern China by way of the Red River would be open and followed without danger by the merchant and trader. Private enterprise would be effecting this more completely than can the presence of any number of French bayonets, even though they should be in complete occupation of the strategic points controlling the route and frontier.

But, as a matter of fact, they are not so. The French commanders by their precipitancy and the government by its want of judgment have lost for their country all these advantages, or at least deferred indefinitely their attainment. The troops of the expeditionary force, who should have long ago returned to France, there to receive the well-earned reward of all the dangers and hardships they had undergone, have for months past been wasting away under the malign influences of the treacherous climate of the delta. Though nominally some fifteen thousand strong, the numbers have been so reduced by sickness and the drafting home of time-expired men that there are probably considerably under ten thousand real effectives; and we have seen, in any case, that it has not been found possible to spare a sufficient number of them for the very minor operations required to complete the occupation of certain points in the island of Formosa.

By the dispatch of the considerable reinforcements of twelve thousand men from France and Algeria, now being hastened forward, this force will be raised to a respectable figure and fresh energy infused. But in the mean time China has had for these several months *carte blanche* to make what arrangements she likes for opposing a French advance north of the delta. What these arrangements may have been there is no authentic information; but it is reported that three armies, each numbering from fifteen to twenty thousand men, have been in course of concentration on the Chinese frontier of Tonkin for the invasion of that province by the roads leading to Laokai, Bac-Ninh, and Lang-son.

There is nothing the French commanders would like better than that the Chinese troops should be engaged in an operation which would give the former a favorable opportunity of proving the superiority of their soldiers in the open field. But such a step on the part of the Chinese is highly improbable; and it may be taken for granted that the bulk of the troops so concentrated will not advance beyond the points in the northern territory of Tonkin which continue to be occupied by Chinese garrisons. If this should be so, long and arduous marches on bad roads, under great difficulties as to transport, will be necessary before the French troops can be in a position to carry out the immediate programme ordered by the war ministry, of completing the occupation of the northern portion of the province and confining the Chinese troops to the other side of their frontier.

Already the preliminary operations have been commenced, and General Brière de l'Isle is marching on Lang-son, by the valley of the Loc-nan, without waiting for further reinforcements. The first engagement of the new campaign has been fought by Négrier's brigade, when, according to the meagre accounts as yet received, the Chinese force, estimated at twelve thousand men, took the offensive the day following the defeat of its advanced guard. Its repulse is officially reported to have been complete, which was to be expected, and this success will have cleared the way, in some degree, for the further advance of the French force. Its casualties, however, were not far short of a hundred; and if this is to be taken as an index of the resistance which will be encountered step by step until the frontier is reached, General Brière de l'Isle has an arduous task before him.

We have only to read the account of the Bac Lé affair to realize the difficulties presented by the country in an advance outside the sphere of the waterways and unsupported by a heavily-armed flotilla —and the facilities offered by them to a partisan warfare. The force that fell upon Dugenne's column on that occasion was completely screened by impenetrable thicket, and the advanced guard found itself confined to a narrow path, shut in on every side, and powerless to act effectively.

But, as the new minister of war remarked in the chamber a short time ago, some difficulties are inseparable from all distant expeditions, and we may believe that those to be met with in this campaign will be successfully overcome, and the immediate objects for which it is being undertaken attained before the hot weather again sets in. The question will then be, what is to follow? Will the expulsion of the Chinese troops from Tonkin, and the occupation by the French troops of the whole of that country, effect the settlement of the question on a basis alike acceptable to the two powers?

So far as can be foreseen, it will not; but will be rather calculated to further exasperate the Mandarins and encourage them in the belief that whatever may be the success of the French arms in the distant southern province, the empire itself is secure from an attack that the French are so evidently loth to undertake. The sacrifice of a few thousand troops in Tonkin is absolutely nothing to them, and it may be taken for granted that French successes there will be attributed solely to the incapacity or treachery of the Chinese commander on the spot.

What is to follow, then, if, after the complete occupation of the Tonkin territory by the French, Chinese troops are still poured down to the frontier, and the country still excited to hostile action against the invaders? The strain which would be put upon the army of occupation by the serious losses inseparable from a prolonged occupation of the country during the hot season must be very great, and could not be relieved without further and still more extensive operations, necessitating large reinforcements.

Already the army system has been subjected to a great strain; for the French army, recruited by universal service, is little suited to such enterprises, and the experience of the later expeditions undertaken by France has been to show that they are equally unpopular with the army itself and with the country at large. The government has lately been questioned as to whether a complete mobilization of the army would not be interfered with by the successive reinforcements dispatched to the army in the East; and though General Lewal, the new war minister, has been able to state that the first line and the corps in Algeria had been left absolutely intact, he has had to admit that it would be necessary for him to ask the chambers for the means of effecting a small mobilization.

But there is yet another aspect of the question, and, as regards British interests, not an unimportant one. In each treaty port in China there is a considerable body of European merchants and traders, forming among themselves a separate community, the interests of whom are in the main identical. To the native eye they are all alike "foreign devils;" and it may be said they are only free from molestation on sufferance, by virtue of the treaties forced upon China by European bayonets. It is now close upon a quarter of a century since she has felt the power of these, and the lesson, if not forgotten, has at least fallen into the background. Already, before these troubles with France commenced, there had been for some years complaints of the high-handed procedure of Chinese officials in encroaching upon the rights accorded to Europeans by treaty.

Representations on the subject were made from time to time to the proper authorities; but they were not supported with sufficient energy to obtain redress, and serve as an example for the future. The susceptibilities of the Mandarins were regarded, rather than the interest of the merchants, in minor matters, and it naturally led to a state of affairs which must be regarded as anything but satisfactory.

But, bad as it was, the situation has been greatly aggravated by the action of the French at Foochow, which was no doubt intended to serve as a wholesome example to the governing body at Pekin. As a matter of fact the only result has been to exasperate the natives against the European community wherever such exists, and to give cause for serious apprehension, in some cases, for their safety. No one can gainsay the thoroughness of the operation in itself. All government property, the local fleet, dock-yard, arsenal, and forts on the river Min were destroyed by Admiral Courbet, root and branch, a large number of lives being sacrificed in the operation. But throughout the Celestial Empire an extraordinary callousness prevails towards the misfortune of others, and, so long always as the course of events does not carry French bombs into their own homesteads, the inhabitants of each district are content to view the casualties which may befall their countrymen elsewhere with complete indifference.

On the other hand, such actions cannot fail to foster everywhere the feeling of bitter hostility against the "foreign devils," without distinction of creed or nationality. And this feeling is secretly encouraged in Pekin; for the Tsong-li-Yamên grasp at the hope that the inevitable interference with trade, and the apprehensions created among Europeans resident in the country, may produce dissensions among the several powers interested, and turn to the benefit of China.

That such will be really the result is to be doubted, for the real interests of the several European powers are identical. All alike suffer from the depreciation of trade; though Great Britain, as monopolizing a great preponderance in the carrying trade, suffers the most. But in the ultimate interests of commerce any temporary loss will be far preferable to such a settlement as would place China in a position to claim a successful issue from the conflict now in progress. A defeat suffered by France, even though only a diplomatic one, would be fraught with danger to the whole European body, and most assuredly lay the seeds of future disturbance at no distant date.

Already the hesitation of France to enter upon a regular war with China is interpreted, perhaps not unnaturally, at Pekin as a sign of weakness. Every week that passes without serious operations being undertaken increases the self-confidence, not only of the emperor and the Mandarins, but of every official, large and small, from one end of the empire to the other. What, then, might not be expected to follow an undisguised diplomatic victory over the barbarians?

The proposition of such a line of conduct on the part of France is, for this reason, absolutely inadmissible. Unless China should comply in every material particular with the demands made upon her, France has no alternative but to follow up her partial bombardments and blockades with hostilities of a more serious nature.

The country is beginning now, for the first time, to realize this, and M. Ferry's government find themselves on the horns of an embarrassing dilemma. So long as there was a prospect of China being frightened into giving way, he was able to satisfy the chambers with encouraging accounts of the glorious behavior of the soldiers and sailors who were fighting in these distant parts for the honor of their country. But he is now perforce reduced to asking them to choose between an inglorious accommodation, involving certain loss of prestige combined with serious danger in the future, and an unpopular war only to be brought to a successful issue at the cost of great sacrifices.

Under these circumstances it can hardly be doubted what their decision must be. While bringing against the government a heavy indictment for the blundering policy that has led to the existing state of affairs, the chambers can hardly fail to concur in the necessity for putting an end to it as early as practicable by force of arms. Assuming that this may not improbably be the conclusion arrived at, a consideration of the defensive capabilities of China will not be without interest. The measure of these must not be taken from the amount of opposition encountered in our advance upon Pekin four-and-twenty years ago. Since that time China has made a considerable advance, not only in her defensive works and armaments, but also in the organization of her forces. The incident of the Foochow forts has shown how helpless she still is against attack under conditions in which the well-served guns of a French fleet can be brought to bear on her defenses, and on shore the superior organization and leading of European troops must still have a decisive effect. Nevertheless, an advance upon Pekin, or even on Canton, will prove an undertaking offering difficulties with which those encountered in 1860 are not to be compared.

Numerous forts of the most approved type have been erected of late years round Canton, in the Gulf of Petchili, at Takoo, Pehtang, and along the banks of the Peiho River as far as Tientsin, and are heavily armed with Armstrong and Krupp guns. The disaster of 1859, by which several British gunboats were lost and many lives sacrificed in a gallant but unsuccessful attack upon the Takoo forts that guard the entrance to the Peiho River, sufficiently demonstrated even at that time the difficulties to be encountered in attacking them from the sea. When, therefore, in the following year, the plan for the campaign determined upon came to be discussed, the allied commanders agreed in pronouncing them impregnable on this side, and their judgment proved to be amply justified when the actual state of the defenses was fully known.

The forts themselves were built in the alluvial mud deposit which flanks the river on either side for a distance of six or seven miles upwards from its mouth. They were strong, heavily-armed redoubts, with ramparts on the sea-front containing casemated batteries, and the approach from the river was defended by from two to three encircling ditches and lines of stakes. Those situated on the south bank ran the whole length of and directly commanded a series of obstacles placed in the river, through which a passage could only be made with great difficulty for the passage of our gunboats, even after they had fallen into our hands. These impassable obstacles consisted of successive lines composed of piles, stakes, booms, and chains of great weight and strength, and, besides being commanded by the southern forts, were also under fire from the northern ones, situated farther up the river.

But although great ingenuity had been displayed on these obstacles, with the effect of completely barring the entrance of the river from the sea, a great omission had been made in not providing adequately against the landing of a force at Pehtang, and the protection of the forts on the land side. This omission was turned to account by the force under Sir Hope Grant, which effected a landing unopposed, and thus gained possession of the north forts with comparative ease. That the result might have been different had the landing been opposed, is evident from the account given of it by Wolseley in his narrative of the war. On either bank of the Pehtang, where the force landed, the only *terra firma* were dry mud-banks, and on these were situated large forts. All in front of them, towards the river and sea, was sticky mud, "so that to land in their front, under an unsubdued fire, and then storm them, would be altogether impossible."

The operation, then, even at that time, was fraught with great danger; and we may easily imagine what would be the increased difficulties of such an undertaking now, when, profiting by past experience, the Chinese have spared no effort to render the Pehtang branch of the river as difficult of access as the Peiho. Not only have new forts been erected, but those which previously existed, both at Pehtang and Takoo, have been perfected on their land faces, and provided even in some cases with plated cupolas. But the comparison between the former and the existing state of the defenses does not end here; for the torpedo has now taken its place in the system of defense under conditions most favorable to its employment, and the defenses have been extended up the river as far as Tientsin.

At Canton, also, the improvement of the defenses has not been neglected. They have been vigorously pushed on under the direction of European officers, and are said to be so complete that, if properly defended, the approach to the city by water would be most difficult, if not, indeed, impossible. The Bogue forts command a passage only half a mile in width, access to which is protected by a line of torpedoes flanked by a number of batteries hidden in the surrounding hills. From the Bogue to Whampoa, situated thirty miles up the river, the channel is in some places very narrow, and the water not sufficiently deep to admit the passage of ironclads. This post is itself secured by a chain of forts, some of which are of a formidable nature, and its approach is further barred by a second line of torpedoes. Canton is distant about ten miles farther up the river, the main passage of which has been blocked, leaving only a narrow and shallow branch for the use of native shipping.

From the brief description here given of the defenses guarding the entrance to the waterways which lead to the only two vital points of the empire, it will be seen that the French government may well be excused the show of some hesitation, and an evident inclination to come to a satisfactory compromise before embarking upon an enterprise that must tax the energies of France in no trifling degree. In the hands of European soldiers, commanded by properly-trained officers, the obstacles presented might, indeed, be literally regarded as impregnable; but we have too often seen the strongest defensive arrangements rendered of no avail by the want of good leaders and material among the defenders to regard them in this light. Instances are not wanting in the late French operations in Tonkin of an attack from an unexpected quarter, or an unguarded point, causing a sudden and complete collapse of the defense, as was notably the case in the attack of Sontay by Courbet from the west, where the defenses were untenable, and in Négrier's turning movement at Bac-Ninh.

This leads us to the consideration of the forces which China has at her disposal for the purpose of opposing an invasion. These have during the last few years been completely reorganized, and in great part rearmed with Mauser and Remington rifles and field-guns. There is the regular active force, divided into three portions, termed the armies of Manchuria, the Centre, and Turkestan; and there is the Territorial force, which has replaced in a great measure the former militia, termed the Army of the Green Standard. The Manchuria army has a strength of about seventy thousand men, recruited among the warlike tribes of North China, and is formed in two army corps, of which one is located between that portion of the Russian frontier marked by the river Amoor and Pekin, and the other north of and at no great distance from the Gulf of Petchili. The Army of the Centre is about fifty thousand strong, and capable of being raised to double that number in time of war. Its headquarters are situated to the northwest of Pekin, for the defense of which city it is more especially destined; and it has consequently received a more complete training. It has comparatively lately received a considerable augmentation by the incorporation of a number of irregular troops recruited from the Mongol tribes of Western China, which are distributed in the towns on the littoral of the Gulf of Petchili.

Providing there was no apprehension from the direction of the Amoor, the bulk of these forces would be available to oppose an advance from the coast, and would, from their numbers alone, form a formidable obstacle to an invading force. Though from the defects of their still faulty organization, the absence of skilled leaders, and want of training in the methods of European warfare, they could not stand for a moment in the open field against a properly-constituted French force, they must, nevertheless, be regarded in quite a different light to the untrained and badly-armed levies which disputed our advance in 1860. Under the altered conditions, no general would now care to undertake an expedition to Pekin with fourteen thousand men,—the number at the disposal of Sir Hope Grant. Indeed, a French general, who has had considerable experience in Tonkin, is credited with having lately expressed an opinion that to do so successfully a force of sixty thousand men would be required, though probably a mean between the two would be nearer the mark.

The third portion of the Chinese regular force is the Army of Turkestan, which garrisons the Western provinces; but it is too far from the others to afford much assistance, except, perhaps, in the case of prolonged resistance, even if its services could be safely dispensed with elsewhere. But besides the three armies which boast a more or less regular constitution, there is the Territorial force, to which each of the eighteen provinces contributes an army corps. The cadres of this are placed at two hundred thousand men, with capabilities for almost indefinite expansion, being drawn from a population of three hundred and fifty millions in China proper, besides some thirty millions more in outlying provinces. Nearly the whole of these Territorial forces are armed with the Mauser rifle, and have attached to them seven hundred breech-loading field-guns. It is formed naturally of very different elements, some warlike,—such as the Tartars, the courage of whose horsemen and their utter disregard of fire elicited the admiration of their opponents in the last war,—while a large proportion are probably of little value.

Such numbers, however, armed with weapons of precision are not to be lightly treated. Whatever their defects in organization and training, if the advice given to the Chinese by Gordon, when hostilities with Russia seemed imminent, should be followed, and their operations conducted so as to harass an invader by every means in their power, while avoiding a regular battle, the Chinese might prove themselves to be no despicable foe.

TORPEDO-BOAT WARFARE.

BY C. SLEEMAN.

In future naval wars the torpedo-boat will undoubtedly play a very important part, even if but a tithe of the deadliness usually accredited to it be realized; yet a careful perusal of the numerous published lectures, papers, and letters treating of this important question forces the conclusion that the value of the torpedo-boat is apparently considered as commencing and ending with its capabilities as a handy, fast, and sea-going vessel, inasmuch as any serious attempt to elucidate a system of tactics for torpedo-boats, or to determine how to utilize them most advantageously, whether for offense or defense, is conspicuous by its absence; while the torpedo armament, which surely constitutes their real value as fighting units, would appear to be a mere matter of detail, as it is usually altogether ignored.

Doubtless much of this omission is due to the want of any practical experience of the employment of modern torpedo-boats in actual war; but though this want still exists, yet, at the risk of being charged with temerity, there seems no adequate reason why this vital question should not be treated in a more abstract manner than has yet been attempted by discussing each function of the torpedo-boat in detail; for however misconceived the views herein expressed may be in the opinion of naval officers, yet the mere fact of creating a controversy on the subject can but tend advantageously to the more rapid and perfect development of this branch of naval warfare in exposing the weak and bringing more prominently forward the strong points of torpedo-boat attack and defense.

It was during the American civil war (1861–63) that boats armed with spar torpedoes were first brought into use; but it remained for the Russo-Turkish war (1877–78) to see the introduction of the torpedo-boat proper,—*i.e.*, a craft specially designed for this particular service, having as its principal characteristics high speed and great handiness, since which time this branch of naval construction has been developed with astonishing rapidity; while during the protracted struggle between Chili and Peru (1879–81) several instances are recorded of the use of Yarrow, Thornycroft, and Hereschoff torpedo-boats by both belligerents.

A study of what has been achieved in actual warfare with torpedoes of one kind or another (spar, towing, or Whitehead), manipulated from boats whether specially constructed or not, affords but meagre practical information on which to build up a system of tactics for torpedo-boat warfare, for the reason that in each of the cases cited the conditions under which the torpedo-boat operations were conducted differ materially from what will seemingly occur in future naval wars; while in the latter two instances there must be added a certain want of dash and determination to succeed at all hazards on the part of the offense, which must ever seriously militate against the successful issue of an attack of this nature.

In the American war the boats of the attack were ordinary wooden ones propelled by oars, and armed with a very primitive spar torpedo, arranged to be fired on contact by means of a chemical fuse. In 1877 the Russians possessed some special Yarrow and Thornycroft boats, while their armament consisted of either an improved electric spar, a towing, or the now well-known Whitehead torpedo; and on the part of the defense a somewhat better condition of affairs existed than in 1861, as the Turkish ships were provided with a few Gatlings, a solitary electric light, one or two Hotchkiss revolving cannon, and the Winchester repeating rifle. Lastly, in the war of 1879–81, some of the Chilian and Peruvian ships were armed with Nordenfelt and the Hotchkiss guns, while the armament of the torpedo-boats (Yarrow, Thornycroft, and Hereschoff) consisted of the McEvoy electric spar and Harvey towing torpedoes.

It has often been argued that in the American war the absence on the part of the defense of machine-guns, electric lights, ship torpedo-boats, steam guard-boats, etc., is a fair set-off against the absence on the part of the attack of specially-designed steam torpedo-boats, Whitehead torpedoes, etc., and that, therefore, an effective lesson is to be learned from these torpedo-boats of twenty years ago; but the only instructive feature to be gleaned therefrom that can serve as a noteworthy example for similar operations in the future is the admirable pluck evinced by those in charge of the various attacks, which must be held worthy of the highest praise, and affords certainly a valuable and useful lesson.

If the torpedo-boat operations carried out during the civil war in America, the Russo-Turkish, and Chili-Peruvian wars be carefully studied, it will be apparent that the few recorded successful issues are attributable to the supineness of the crews of the vessels attacked, and lack of any systematic defensive measures,—a condition of affairs which must always conduce to the success of an attack of this kind, which largely depends on obtaining this result by effecting a surprise; on the other hand, it will be evident that the many known failures on the part of the attack were generally caused, not by the obstructive power of the defense, but by the want of unanimity on the part of those in charge of the different boats forming the attack, as well as of sound practical knowledge of the mode of conducting it and of the manipulation of the torpedoes themselves,—negative qualities to which may be attributed all the failures, including those where from the apathy of the defense successes were seemingly invited.

It will thus be seen that, as is unfortunately the case in all matters pertaining to torpedo warfare, no help is available from past experience to guide in forming a basis on which to construct a system of torpedo attack and defense for future use; yet there must not be passed over one very important lesson to be learned from the past, as well as from the present French war of reprisals in China, which is, the criminal weakness of a policy of delay in acquiring new and unproved implements of war (especially those connected with torpedo work) until just previous to the outbreak of hostilities; and, further, the utter fallacy of purchasing such, even at the proper time, unless those who will have to operate them in actual war have been carefully instructed in and habituated to their use, as illustrated by the recent disastrous results to the Chinese of the French operations at Foochow, where the former completely failed to make any practical use of the latest types of war-material stored by them at that place.

Every weapon of war requires those who will have to manipulate it to be afforded every opportunity of constant practice to enable it to be utilized to the fullest extent of its power; and in no case is this so necessary as in that of the torpedo-boat, which with its armament is composed of a mass of intricate machinery, demanding specially instructed and practiced engineers and stokers to drive them properly, as well as highly-trained officers and men to handle them and their torpedoes with the utmost precision and coolness; conditions so conducive to success, but which can only be properly secured by *practice, practice, practice,* with the boats under conditions as nearly approaching those of actual war as it is possible to obtain in times of peace.

The experience obtained from our torpedo-boat flotilla operations of last summer affords ample testimony as to the absolute necessity of habituating the officers and crews to the peculiar nature of this service.

Our dilatoriness in providing an efficient torpedo-boat fleet is most culpable; for not only do we thus prevent our own torpedo officers and men from becoming skilled and practiced exponents of this branch of naval warfare, but we also allow those of other powers, such as France, Italy, Russia, Austria, etc., who have been long provided with fleets of torpedo-boats, and are rapidly and continually increasing them, to forge well ahead of us in this particular matter.

Torpedo-boats, however perfect in every detail, unless manned by skilled manipulators, are deprived of a great portion of their deadliness.

The principal considerations of torpedo-boat warfare include, for the first part, the vessels themselves, their torpedo armament, or means of offense, and their gun-equipment, or means of self-defense; for the second part, the defense of ships, and the various systems of tactics best adapted to the different phases of attack, such as during fleet or single-ship engagements on the open sea, the attack of one or more ships at anchor, the prevention of a close blockade by the enemy of their own ports, and in assisting their own fleets to effectually perform this service on the enemy's ports.

In different navies there exist at the present time several types of torpedo-boats, which may, however, be classified for all practical purposes as follows:

CLASS I., OR SEA-GOING.

Type.	Yarrow. (German).	Normand. (Poti.)	Thornycroft. (German.)	English.
Length..............feet	120	124.6	120	113 feet.
Breadth.............. "	13¼	11.6	12½	12½ feet.
Maximum draught........ "	5½	7	......	6½ "
Displacement (loaded).........tons	64	68.3	......	62 tons.
Maximum speed..............knots	19 for 3 hours.	18½	......	18½ to 19 knots.
Coal supply ....tons	25	......	......	12 tons.
Consumption at full power.. "	1 per hour.	......	......	1 per hour.
" " 10 knots...cwts.	2 "	2.2 (11½ knots.)	......	2 cwts.(11 knots).
Coal endurance at 10 knots..miles	2000 to 2200	...... *	......	1500 miles.
Armament. torpedoes In tubes...	2	2	2	Probably 1
In reserve	2	2	2	" 4 †
guns, machine............	1	......	......	" 2

* 9.4 tons of coal required for one thousand miles run at 11.57 knots.

† In deck tubes, two to each of the bow and stern conning towers.

The Yarrow and Thornycroft 120-foot boats have been built to the order of the German government for competition with similar torpedo-boats built in that country.

The French navy possesses five of the Normand 124-foot boats, similar to the type given in the table, and ten somewhat heavier ones, while three more of 130-foot length are now under construction; while the Russian navy possesses one of them, the "Poti."

For our navy four of the 110-foot boats mentioned in the table are now being built, two each by Messrs. Yarrow and Thornycroft, but they are to be precisely similar in all respects; while the Austrian government have recently ordered from Messrs. Yarrow a 135-foot boat of this class, with 13¾-feet beam, which is to have a speed of some twenty-four knots.

Class I. includes all torpedo-boats of 100-foot and upwards.

CLASS II., OR HARBOR (ENGLISH FIRST-CLASS).

Type.	Yarrow.	Thornycroft.*
Length......feet	86	87
Breadth...... "	10⅝	10½
Maximum draught...... "	5	5⅛
Displacement (loaded)......tons	88	82.4
Maximum speed......knots	21.94	21.76
Coal supply......tons	5	...
Consumption at full power......cwts.	14	...
" " 10 knots...... "	1¼	...
Armament: torpedoes { in tubes......	2	2
in reserve......	1	1

CLASS III., OR SHIP (ENGLISH SECOND-CLASS).

Type.	Yarrow.	Thornycroft.†
Length......feet	63	68
Breadth...... "	7½	7½
Maximum draught...... "	8½	8⅛
Displacement......tons	13	12½
Maximum speed......knots	17¼ for 2 hours.	17.58
Coal supply......tons	1	...
Consumption at full power......cwts.	6	...
" " 10 knots...... "	½	...
Armament: torpedoes in tubes‡......	2	2

* Lecture at Institution of Civil Engineers, 1881.

† British Association Lecture, 1882.

‡ In some of the earlier boats, the torpedoes are discharged from side-frames.

The general characteristics of all these classes of torpedo-boats are high speed, and considerable manœuvring powers; while those of Class II., as compared with Class III., have, in addition, fair accommodation, good sea-going qualities, and a fair amount of coal endurance; and those of Class I. have these special features in a much higher degree of excellence than the Class II. boats.

The capability of the boats in Class I. to make a long sea-way has been satisfactorily demonstrated on several occasions, in so far as the vessels and their machinery are concerned; but the necessarily small space that can be apportioned for the accommodation of the officers and men in these boats, and the fact that these craft are also very lively and wet in a sea-way, must render life on board them during a long voyage very irksome and trying, a fact that will be confirmed by the officers and men of the "Childers," a Thornycroft 113-foot boat which was recently steamed all the way from London to Australia, the journey occupying more than a hundred days.

It is not desirable here to enter into any disquisition as to the comparative merits of the torpedo-boats turned out by different firms, as, though there may exist certain constructive details peculiar to each, yet whether it be Messrs. Yarrow, Thornycroft, Normand, or other torpedo-boat builders, they may one and all be fairly accredited with achieving a very high degree of excellence in the design and construction of such craft and their machinery, and, though not absolutely perfect, they have undoubtedly reached within a very measurable distance of that desirable consummation. It may well be said that the speed, coal endurance, handiness, and sea-going qualities of each class is the maximum possible consistent with their other requisite qualities.

The speed of the sea-going torpedo-boat, up to a certain point, is limited only by its dimensions and its cost; but though a higher speed than nineteen knots is for such craft an advantage in some respects, it is doubtful whether this advantage will outweigh the disadvantages of increased length, breadth, draught of water, and displacement, as well as increased cost, the latter deciding, in some measure, the number of them; a few 24-knot boats would not be so generally effective as double or half as many more 19-knot boats.

Further, it seems to be the growing opinion of naval officers that in Class I. sea-going qualities, coal endurance, and accommodation are more to be considered than excessive high speed to render these boats most suitable for the service they will have to perform in war-time, which means increasing the beam at a sacrifice of a small portion of maximum speed, and the additional space thus obtained for the engines and stoke-hole will enable the actual full speed of the boat to be more easily maintained.

However, these matters, together with the question as to the best system of torpedo-gun, and impulse, can alone be properly settled by naval officers, and it is time that some definite type of boat for each class (if more than one class is considered necessary) be determined on. At the present time our small torpedo-boat flotilla comprises a variety of types, and of methods of discharging their torpedoes, which is a most serious evil, inasmuch as torpedo-boat operations will, except in rare cases, be conducted with a number of boats, under which circumstances unanimity of action will be an essential condition of success, and, it is needless to say, infinitely more likely to be attained in a flotilla where similarity, not heterogeneousness, is the leading characteristic.

The principal constructive difference between torpedo-boats is in the shape of the deck, which in the Thornycroft type partakes in section of a tall hat, but with sloping sides, while in the Yarrow type it is of a curved arch from the section approaching more nearly to that of a circle; the former admits of a narrow, flat side-walk, and greater height between decks, which may doubtless be convenient, but the latter has the form of greatest structural strength, as well as of rendering the boat more sea-worthy, and less vibration at high speeds. The Normand boats have the Yarrow form of deck, and the small amount of vibration experienced with these boats on their full-speed trials has been much commented on, especially when compared with our 90-foot boats.

But, notwithstanding, it seems as though our torpedo-officers preferred the Thornycroft deck, as all of the four 110-foot boats now being built for our navy are to be of that type.

In regard to the machinery of these extremely fast boats, in so far as general efficiency is to be considered, there is little to be desired; but it ought now to be possible to definitely settle on a common arrangement of machinery for all our torpedo-boats of either class, no matter by whom built, so that the engineer officers and stokers, who would have to work the machinery and drive the boats, would be able to go at any time from one boat to another without needing fresh instruction and experience in working them up to their full power.

There is one point connected with the torpedo-boats which demands serious attention, viz., the difficulty of repairing their machinery after the considerable wear and tear occasioned in running them constantly at full power, owing to the necessarily extreme lightness of their construction, especially in the smaller boats. For instance, it has been found impossible to bore out the cylinders when roughened by hard work, as they are originally made as thin as is permissible.

Coming next to the protective features of torpedo-boats; here it will be necessary to consider each class separately, and, as no material difference exists in this respect between the boats of different firms, the Yarrow type will alone be treated of, and in the following statement will be seen the amount of protection afforded to the vital parts of each class of torpedo-boat.

1st. To reach the boiler of a Class I. sea-going torpedo-boat, a bullet fired in a line with its keel would have to pass through the following plates, bulkheads, etc.: the bow plate, .12″ thick, at an angle of 20°; six bulkheads at 90°, each .083″ thick; fore side of coal-bunker at 90°, thickness .065″; 4½ feet of coal; and, lastly, aft side of coal-bunker at 90°, thickness .065″.

In Class II. (Harbor) torpedo-boat, the bullet would have the following work of penetration: the bow plate at 13°, thickness .083″, and three bulkheads at 90°, each .072″ thick. At the Portsmouth trials of the Nordenfelt and Hotchkiss anti-torpedo-boat guns, the former weapon with its steel bullet succeeded in effecting this work at a range of three hundred yards, and also penetrated some distance into the half-inch steel boiler side; but not so the Hotchkiss gun with common shell, which burst on penetrating the first or foremost bulkhead.

In Class III. (Ship) torpedo-boat, the bullet would have the following work of penetration: the bow plate at 15°, thickness .065″, and three bulkheads at 90°, each .065″ thick.

2d. To reach air-chamber of Whiteheads, a bullet fired at a point twelve feet from the stem of the boat, and at 90° to the keel, would have to pass through, in Class I., the hull plate, .12″ thick, and side of torpedo-tube $\frac{3}{16}$″ thick; in Class II., the hull plate .083″ thick, and side of torpedo-tube $\frac{3}{16}$″ thick; and in Class III., the hull plate .065″ thick, and side of torpedo-tube $\frac{3}{16}$″ thick.

3d. To reach centre of side of boiler:

In Class I.—distance of striking point from stem fifty-seven feet—hull plate at 90°, thickness .12″; outer side of coal-bunker .065″ thick, 3 feet of coal, and inner side of coal-bunker .065″ thick.

In Class II.—distance from stem thirty-two feet—hull plate .083″ thick, outer side of coal-bunker .065″ thick, 2¼ feet of coal, and inner side of coal-bunker .065″ thick.

In Class III.—distance from stem twenty-six feet—hull plate .065″ thick, outer side of coal-bunker .065″ thick, 1½ feet of coal, and inner side of coal-bunker .065″ thick.

4th. To reach machinery:

In Classes I., II., and III., only hull plate, each respectively .12″, .083″, and .065″ thick, and distance of striking point respectively eighty-four feet, fifty-four feet, and forty-one feet from stem of boat.

Thickness of conning towers of Classes I., II., III. boats is respectively one-half, one-quarter, and three-sixteenths inch steel plate.

From this table it will be observed that the boiler and machinery are exceedingly well protected in making a direct end-on attack; but while the boiler is also fairly well protected on the broadside, the machinery has only the actual skin thickness of the hull between it and the enemy's bullets, or shells; and though part of it lies below the water-line, yet but a little sea would at once reduce this form of protection. So in regard to the torpedoes lying in their guns and their discharging gear, they would be afforded much greater protection in a direct end-on attack than if the broadside of the boat be exposed to the fire of the ship or hostile torpedo-boat; the piercing of the Whitehead air-chamber or charge would most probably destroy or render useless the torpedoes; and even a bullet entering the skin of either torpedo might either cause it to sink on its run or render it most inaccurate; while a bullet striking the impulse gear, or piercing the torpedo gun-tube, might completely frustrate the attack by preventing the discharge of the torpedoes.

But notwithstanding that in torpedo-boat operations the end-on attack affords the most protection to the attack, there is a decided liking on the part of our torpedoists for movable in the place of fixed bow-torpedo tubes or guns, which will permit of the Whitehead being discharged on the beam, and before or abaft it, the theory being that on reaching the desired distance from the attacked ship the helm of the torpedo-boat would be put over and the Whitehead discharged as the boat comes round; and thus, without stopping the engines, or bringing the boat too near, she can be brought round to make a second attack; while in making an end-on attack it will be necessary to stop the boat the moment of the discharge of the Whiteheads to prevent her from running too close to the ship, and that under these circumstances the chance of making a second attack will be small.

Further, it is considered by our officers that the end-on firing of Whiteheads from the boat going at high speed is most uncertain, owing to the observed tendency of the torpedo to shoot clear out of the water, or dive down to the bottom when discharged under these conditions; thus the future arrangement of torpedo-tubes will for this reason be in our first-class boats, as previously described.

All torpedo-boats are provided with a conning tower, pierced with many loopholes, in which the steering-wheel, engine-room, telegraph, and the Whitehead firing-keys or triggers are placed for the purpose of protecting the officer in charge and steersman; but except in a daylight attack the officer will rarely be in a position to avail himself of this mode of protection, owing to the difficulty of obtaining a good clear view for his binoculars in the darkness of a night attack, but he will be obliged either to stand up in the conning tower with his head through the top opening, or to lie down flat on the deck in front, in both of which cases he will be necessarily much exposed to the chance of disablement from the hail of bullets that will be poured on the boat by the guns of the defense.

It may be readily understood that it is by no means an easy task to pick up a ship under steam off a port, or, in making the entrance and passage of most probably a strange harbor, to attack a ship at anchor therein at night-time, and the commanders of the torpedo-boat will require a perfectly unobstructive view to enable them to effect this service with the greatest chance of success; while in the actual attack few commanders will care to be shut up in a steel box, the exciting nature of such an enterprise, and the general rush and seeming confusion reigning around this peculiar operation, apparent even in a sham attack, will call for the commander's eye to be everywhere.

At present the conning towers vary in size from three and a half feet to four and a half feet in diameter, which allows room for the officer and one sailor, the steering-wheels, engine-room, telegraphs, etc.; but the tower might be made much smaller if electricity be used for steering, etc., and controlled by the officer alone, and might also be constructed of thick steel plates.

Further, a thickness of half-inch steel by no means affords security to those it shields from the light guns of a ship, even at one thousand yards range.

Up to the present time the Nordenfelt 4-barrel 1-inch gun, and the Hotchkiss 5-barrel 1½-inch shell revolving gun, represent the special armament of ships for defense against torpedo-boats, and both may be considered as equal in penetrative power (the Hotchkiss firing common shells and the Nordenfelt solid steel bullets); but there is a decided tendency on the part of some of the powers to go in for a somewhat powerful anti-torpedo-boat gun, and our navy will soon be provided with a considerable number of the quick-firing 6-pounder guns, which, though not specially intended as anti-torpedo-boat guns, will yet be an effective auxiliary armament for that purpose; while as against this increase in the power of the light guns of the defense in the immediate future it is difficult—nay, impossible—to further protect the torpedo-boat proper against shot and shell, and the only way of meeting this on the part of the attack is to improve the Whitehead in respect to affording it a much greater accurate range than it is now capable of, or to equip the torpedo-boat with a controllable locomotive torpedo having a very considerable range.

A partially armored torpedo-boat, or rather vessel, has been schemed out by Mr. Yarrow, with the result that to protect the vital parts with steel armor one and one-half inches thick, and to provide a steel deck one inch thick, the vessel would have to be made one hundred and sixty to one hundred and seventy feet long and nineteen to twenty feet wide for a speed of nineteen knots; but such a craft would not be absolutely impenetrable, nor would it possess the features inherent to the torpedo-boat proper, by reason of its greater size and cost.

A consideration of the whole question of the attack of torpedo-boats as compared with the protection afforded to their vital parts, in which must be included not alone the boiler and machinery, but also the officer in charge, the torpedoes, and their gear, points to the conclusion that the defense would appear generally to have a better chance of success in frustrating such an attack by disabling one or other of the latter vital parts than in any other way.

Though numerous machine-gun and torpedo-boat experiments have been carried out in this and other countries, yet, excepting those lately conducted in Russia, none can be said to have afforded any very definite information as to what is likely to occur in a torpedo-boat attack in actual war; and even in the exception of the Russian experiments, when actual torpedo-boats towed past a ship *broadside*-on were fired at, this affair partook too much of a trial of the penetrative power and shooting qualities of the guns engaged rather than a test as to the actual damage likely to accrue to a torpedo-boat fully equipped and manned. It would seem almost imperative that some more realistic operation be carried out, and that, too, before any actual steps are taken in adopting the movable above-deck torpedo-tubes and broadside-firing of the Whiteheads in the place of the present fixed bow-tubes and end-on attack.

For instance, why should not a torpedo-boat be fitted with a length of cable (say one mile) reeled up in a manner similar to that of the Lay torpedo-cable, and also provided with electric gear for steering her, and starting and stopping her engines, and then, having placed dummy figures representing the officers and crew in their proper places, and the torpedo-boat fully equipped, let her be run, as in making an end-on attack, against a ship provided with her proper complement of guns of all descriptions, and which vessel should open fire with the boat twelve hundred yards distant, and cease fire when she has reached her firing position, six hundred yards distant from the ship?

A second test might similarly be made with the torpedo-boat with two or four movable above-deck tubes and one or two conning towers, the boat being steered as would actually be done in making an attack with a torpedo-boat thus fitted; and, lastly, a similar series of experiments might be made at night-time.

The above is merely put forward as a rough sketch of a far more realistic experiment than has yet been attempted, and the results could not but be well worth any expense incurred; the details would, of course, have to be carefully worked out, but there seem no unreasonable difficulties in the way. As the ship's guns' crews would not have the actual fear of their vessel being torpedoed and sunk, and as the attack would only be made with one instead of a number of boats, they would possibly fire with greater coolness and accuracy, and therefore it might be advisable to somewhat reduce the number of guns brought into action.

Valuable and lasting information would be obtained from such an experiment if properly conducted, which would be extremely useful in designing our torpedo-boats of the future.

The next point to be treated of is a most important though much neglected one, viz., the torpedo armament of torpedo-boats, which must now be considered as principally composed of Whiteheads of one kind or another, the towing and spar torpedoes being rarely adverted to for this purpose, excepting the latter in some few instances as an auxiliary weapon.

Since the adoption of the Whitehead in 1872 a very considerable advance has been effected in its development, particularly in respect to an increase of its speed, which in the latest production at Woolwich has reached twenty-four knots for six hundred yards, or about three times as high as was attained with the 1872 model, and consequently with its greater speed its accurate range has been nearly doubled,—*i.e.*, six hundred to seven hundred yards as against three hundred and fifty yards in 1872; at the same time in the latest Woolwich Whitehead a greater charge of explosive can be carried while maintaining the same total weight of torpedo.

So far the Whitehead can hardly be said to have achieved any successful results in actual war; but this want of success may be attributed in some measure to the lack of experience in manipulating it by those who have hitherto had the conduct of the Whitehead torpedo-operations, and partly to want of speed and accuracy of the torpedoes then employed as compared with those of the present day. But yet, even with the new highly improved Whiteheads and perfectly experienced manipulators, the element of chance must enter very largely into operations of this nature.

Take, for instance, the case of a ship three hundred feet long at anchor in a harbor, and suppose smooth water, no wind, tide, or current, and allow the torpedo-boat to safely reach the firing positions, say six hundred yards from the ship which is presenting her broadside to the boat, then a Whitehead having a speed of twenty-four knots for this range would miss the ship if, at the instant of discharge, the boat's head be diverged 4° from the direct line of fire from the boat's head to the midship point of the vessel's broadside, or if the torpedo on striking the water be caused to diverge to this small extent from the direct line; and such a divergence of the boat's head might easily happen by the slightest touch of the helm when running at a high speed, or so small an error might readily be made in laying the boat for the ship in the excitement attendant on performing this work while under a heavy continuous fire of machine-guns, etc., or by the beam of an electric light being thrown on the operator at the moment of firing.

The likelihood of such a small error creeping in would be still greater in the event of the attack being made under the adverse conditions of a strong cross-wind and choppy sea, or if a strong tide or current be running at the time across the path of the torpedo, or, again, if the ship be under way.

In a three-knot tide or current the drift of a 24-knot Whitehead in six hundred yards would be two hundred and twenty-five feet, and of a 20-knot one two hundred and seventy feet, so that the necessity of calculating pretty closely not only the rate of the stream but also the distance of the ship will be evident; and under such circumstances the boat would not be lying directly end-on to the ship at the moment of firing her torpedo.

The same reasoning applies to both the case of torpedo-boats with fixed bow-tubes and those with movable above-deck tubes, but in the latter there is the question of the advisability of greatly exposing the torpedo-tubes and torpedoes to the enemy's fire.

In making an attack against a moving ship, the accuracy of striking her with a Whitehead will depend entirely on the correctness with which the speed of the ship is estimated, supposing the torpedo-boat to be within range, and this will be all the more important as the speed of the passing ship increases; while the chances of a successful shot will be very much lessened should the attacked vessel at the instant of the Whitehead being discharged put her helm hard over and turn away from the torpedo-boat, alter her speed to any great extent, or by stopping and going astern; and, further, the slower the speed of the Whitehead and the greater the range, the greater the liability to failure.

In a 24-knot Whitehead, traversing six hundred yards in 44.4 seconds, a mistake of one and a half miles in estimating the speed of the passing ship would mean hitting ninety-eight feet ahead or astern of the point aimed at, which distance is increased to one hundred and seventeen feet for a 20-knot torpedo; while in addition there must be taken into account the liability of failure by a small divergence of the boat's head or of the torpedo itself, as previously explained, even if all the other calculations be correctly estimated and the different adjustments be properly made.

It is not intended here, by any means, to throw discredit on the effectiveness of the Whitehead, which is undoubtedly as perfect as any *uncontrollable* torpedo can well be, but merely to point out that it is not quite so infallible as it is often supposed to be, as well as to press on our naval authorities the absolute necessity that exists for constant and serious practice with this weapon under conditions as nearly approaching what would occur in war as is possible,—in fact, a special Whitehead and torpedo-boat corps ought to be organized, including engineer officers and stokers as well as those of the executive class; and it is impossible to afford to those who will be called upon to perform torpedo offensive operations too much training of a thoroughly practical nature, and carried out at all times of the year, and not, as now seems the rule, only in the summer or fine-weather season; for in actual war it will certainly not be possible to pick and choose the time or season for conducting operations of this nature.

There are some further points in connection with the Whitehead which may at times be the cause of failure, such as the difficulty that has been experienced in maintaining compressed air at the same very high pressure for any length of time; that as in practice it does not always float at the end of its flight, though previously so arranged, so in an actual attack it may not always sink should it fail to strike the ship, but remain floating, and so become a source of great danger alike to friend and foe; the possibility of its diving beneath the bottom of a ship, should it happen to have a downward course at the moment of reaching her; lastly, if its speed be not uniform during its run it will not proceed in a straight line.

The spar torpedo is seemingly being ousted by the small 8-foot Whiteheads, but it ought never to be altogether expunged from naval armaments, as a torpedo-boat attack with that implement has one great advantage over the Whitehead, or any other uncontrollable torpedo, in that up to the very last moment of the attack—*i.e.*, at the instant of exploding it in contact with the ship's side—it carries with it the intelligence of the officer in charge; and if he be properly experienced in handling the spar, and remain cool and collected, and also if the boat survive her last six hundred yards' run at full speed up to the ship, it will strike its blow with almost absolute certainty; and as regards the latter requirement, it is generally considered that the nearer the attacking boat approaches the ship the less becomes the risk of her being hit, owing to the apparent immunity of the boat increasing the excitement of the guns' crews of the defense, and more particularly would this be the case at night-time.

The spar attack is, of course, more easily frustrated by booms, nets, etc., and it carries but a comparatively small charge; still, opportunities may often arise in war where the greater certainty of this mode of attack would be a very decided advantage.

It is worthy of note here, as a case in point, that the only vessel as yet destroyed by a torpedo in the present Franco-Chinese difficulties was a Chinese gunboat that was sunk by a French boat armed with the spar tarpedo.[1]

Future naval war will be pregnant with instances of encounters between the torpedo-boats of the two nations engaged, as demonstrated in the late Chili-Peruvian struggle, and thus there has to be considered the best means of affording to these vessels an adequate gun armament for self-defense.

For this purpose a machine-gun equipment of some sort or another is the only practicable method, and the question then arises as to the kind and number of these weapons to be carried by the boats of each class, and upon which there exists considerable difference of opinion among naval officers of different countries, some preferring a light, single-barreled shell machine-gun, while others prefer, with our naval officers, the Nordenfelt two-barreled 1-inch gun, and these are used alone or in combination with a small rifle-calibre machine-gun, depending on the size of the torpedo-boat; and some put their faith in a rifle-calibre gun alone, but with many barrels. The principal difference between these equipments is the rapid discharges of single small shells, and rapid discharges of volleys of 1-inch steel shot or rifle bullets.

The high speed and rapid movements of the torpedo-boats, and the fact that the engagements between them will usually be conducted at close range, seem to favor the two-barreled 1-inch gun equipment, as this weapon has as much penetrative power, with more than twice the rapidity of fire of the light shell gun, and in addition possesses the feature of discharging volleys, while the rifle-calibre gun, though having even greater rapidity of fire, yet has not sufficient penetration.

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[1] This was written previously to the news received on February 18.—Ed.

In Class I. (sea-going) a small five-barreled rifle-calibre gun may be useful in addition to the 1-inch or shell gun during an attack on a ship after the boat has been discovered, either in disconcerting the guns' crews, or in disabling them and the electric lights.

Whatever gun armament be supplied to the torpedo-boat, it must be of such a weight that together with its necessary store of ammunition it shall not materially reduce the speed or impair the stability and general hardiness of the boat.

There is, besides, another feature in the equipment of torpedo-boats about which, also, some difference of opinion exists, viz., equipping them with an electric search light; but, excepting for services not directly connected with the attack of ships, this equipment does not commend itself, as in the comparative invisibility of the torpedo-boat at night lies one of its chief chances of ultimate success, and the weight of an electric light, dynamo and fittings, is not so small as to permit of being carried unless absolutely indispensable.

(To be continued.)

LORD WOLSELEY'S PLAN OF OPERATIONS.

In a dispatch to Lord Hartington from his headquarters at Korti, which appears in "Correspondence respecting British Military Operations in the Soudan, Egypt, No. 2," dated January 12, Lord Wolseley gave an account of his plan of operations and intentions which has now only an historical interest. But history repeats itself, and unquestionably the account justifies Lord Wolseley in the main idea of his campaign, and meets the objections of ignorant critics and cavillers at home and abroad very satisfactorily.

The object he had in view was to open communications with Gordon in the first place, and to confer with him upon the military and political situation as soon as the object of the expedition had been explained to him (p. 3); and it was Lord Wolseley's expectation, as he explains in the instructions to Sir C. Wilson, given on January 7, the day before Stewart set out from Korti for Metammeh, that the Mahdi might possibly raise the siege of Khartoum when "he realizes fully that an English army is approaching Khartoum;" but he does not appear to have anticipated any opposition on the way to Metammeh, or to have given Sir C. Wilson any definite directions for his guidance, if, on arriving at that place, there were no steamers available. "If there are any steamers, Lord C. Beresford will take possession of one or two of them as he may think best;" and as soon as Lord Charles was ready to proceed, Sir C. Wilson was ready to go up to Khartoum with him to deliver a letter to Gordon, and to confer with him, returning with Lord C. Beresford in steamers to Metammeh as soon as possible. There was to be a small detachment of infantry to be marched through Khartoum, "to show British troops were near at hand." If there were no steamers at Metammeh, Sir C. Wilson was, it may be inferred, to remain with Stewart's column, which was then to advance to Khartoum, and force its way through the Mahdi's army if he still held on to the siege. The siege being raised, "Khartoum would continue to be the political centre of our operations; but Berber would become our military objective, and all our military arrangements would be made with the view to the immediate occupation of Berber and to a march across the desert to Ariab on the road to Suakim." It was a hypothesis throughout, and it was necessarily so if neither Lord Wolseley nor the Mudir of Dongola, nor any one else, could obtain the smallest information respecting the state of affairs at Khartoum, or at places very much nearer, such as Gakdul and Abu Klea, and Metammeh itself. Lord Wolseley was general-in-command of our expedition dispatched by the government with a specific object, and unless it can be shown that he was the responsible adviser of the government, and dictated the time and selected the season for the dispatch of the force, he must remain quite outside the scope of any attack directed against those who made the fatal and utterly inexcusable error summed up in the words, "Too late,"—fatal to the object they had in view, inexcusable, because obstinately committed in defiance of all entreaty, warning, and physical facts. Now, as to the actual scheme of operations to reach the scene, and get within striking distance of Gordon. Two routes were open, —one from the Mediterranean by the Nile, say fifteen hundred miles,— the other from the Red Sea to Berber,—"the military objective,"—say three hundred miles. Lord Wolseley chose the former, and, as we believe, most wisely chose the Nile. For months before the expedition started we urged the adoption of the Nile route,—"hammered away" at it, knowing well the perils and possible disasters attendant on the march of our army across the desert between Suakim and the Nile, and feeling sure that the railway about which people were "uttering such a deal of windy breath" was not and could not be a reality for months to come,—many months,—how many we know not yet, and must leave to fate, contractors, and Osman Digna to determine. The war office experts considered all the points in detail, as the situation was at the time. They decided upon the Nile route, Lord Wolseley concurring and strongly urging its adoption. In that decision the authorities, with practical knowledge, concur also. Ismail Pasha declares emphatically any other route would have been disastrous for such an army at such a time of year. Ratib Pasha, the old war minister of the Khedive, who knows the country thoroughly, and all military "natives" of experience, express similar opinions.

Having once come to that decision, the means of getting up the Nile, then falling, were to be determined from Siout (to which there is a line of railway from Alexandria, a port with great facilities for landing troops and stores, and an immense base of supplies) upwards; and Lord Wolseley, misled somewhat, we thought, by the pleasant souvenirs of the Red River,—its canoes, voyageurs, and *portages*,—had an enormous flotilla of whale-boats ordered for the ascent of a river which "groans" under the weight of innumerable vessels with prodigious sail-power and carrying capacity, by which the traffic of Egypt, Nubia, and the Soudan Nile has been carried on for ages.

"But these boats could not ascend the cataracts!" Granted. There must be *portages*. There had to be *portages* in the ascent of the whale-boat flotilla, also, remember. And there is this to be considered, moreover, that the detachments of troops would have been conveyed from portage to portage much more rapidly in dahabeahs and nuggars, which would have made greater progress, with the steady north wind ever urging them with full sails, than the rowing-boats could make, and that it would have been far easier to have got up supplies and established depots by means of such a flotilla—and many of them were, perforce, employed after all—than was possible in the row-boats. Against that view must be placed the recorded satisfaction of Lord Wolseley with his whalers, and the healthy exercise of the men in rowing. But, at all events, the progress of the expedition was very slow. Lord Wolseley reached Kortion December 16 with the advance guard of the mounted troops, the Second Battalion, South Stafford, in the English boats, being close behind; and he tells us it was "a source of heartfelt regret" that he was not able to reach the general rendezvous at an earlier date, and that his advance had been delayed by the difficulties of collecting supplies at Korti. And yet he had been provident and far-seeing, too. For on September 11 he proposed to form a camel brigade of picked officers and men to make a push across the desert when he arrived at Korti, as he had always thought it possible he might find it necessary when he reached there to operate in two columns (p. 1), one continuing up the river (as Brackenbury is doing), the other "pushing rapidly across the desert to Metammeh." Here, however, there is a hiatus which, no doubt, was filled up in Lord Wolseley's head, though it is not on paper. He knew Gordon was pressed for want of food, and that the hot season was at hand. He knew also that "the march of a small column, as an isolated operation, would be a most useless operation. It would most probably be able to fight its way into Khartoum; possibly it might fight its way out again; but it could not bring away Gordon and his garrison in safety." However, on December 29, he decided on that dangerous measure, as under present circumstances the march presents a very different aspect. "What that difference consisted in was the effect to be produced on the Mahdi by the knowledge that the English army was advancing up the Nile on Khartoum by Abu Hamed and Berber," and that he would have to deal with it as well as the small column.

Now, presuming the Mahdi had the smallest gleam of military light, he would have been guided, "under present circumstances," to have smashed Stewart's column in the desert, and he tried to do it.

At the time Stewart set out, Earle had not begun his ascent of the river at all, and his camp at Hamdab, fifty-four miles above Korti, had not yet been formed; so the Mahdi could not have been under any military pressure from a column hundreds of miles away on the Nile, that would have interfered with his lieutenants' operations in the desert. Lord Wolseley "did not anticipate any serious resistance at Metammeh." He "hoped Stewart would be in possession on January 16;" and he was certainly in no way prepared for the force and resolution with which the Arabs encountered the column in its march, and diverted it from Metammeh to Gubat. We do not know precisely when the Arabs took up a position at Metammeh, but there was a warning given of the movement across the desert which the Arabs were not likely to neglect. Stewart, leaving Korti on December 30, seized Gakdul, seventy miles from Metammeh, on January 2, established his post there, returned to Korti on the 5th, remained there three days, and on the 8th set out on his expedition to seize Metammeh.

But Arabs who had seen the occupation of Gakdul on January 2 would not be long in giving intelligence to the Mahdi's officers of the movement; and so it was that when Stewart, on January 16,—a fortnight afterwards,—came in sight, not of Metammeh, but of Abu Klea, twenty-three miles from his objective, he found a force estimated at ten thousand of the enemy prepared to dispute the possession of the wells with him, and when he had gained the day of January 17 so brilliantly, discovered that Metammeh was too hard a nut to crack offhand. The remainder of the story of the first part of the expedition, in all its sad details, is graven on the heart of the nation. From the 17th to the 23d the men of Stewart's column had "some sharp fighting, extremely hard work, and little sleep." Their gallant leader received his death-wound. It was only on January 28 that Sir C. Wilson could get up the river to Khartoum, to find that so much thought and money and blood had been wasted, and that Gordon had fallen, unconscious of the efforts made to save him, and of the passionate affection and devotion towards his person and character which burned in the hearts of his countrymen, as they will halo his memory in their history forever. So the expedition for the relief of Khartoum and of its defender failed; and now there is another purpose, there is another policy, and there is another plan of operations, of which we have no definite knowledge.

TO OUR SUBSCRIBERS.—For some reason as yet unexplained, our London letter for this number of the QUARTERLY has not come to hand. We shall endeavor to provide against a recurrence of such a happening before our next issue.—L. R. H. & Co.

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THE

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MACHINE GUNS IN THE FIELD.[1]

BY CAPTAIN THE RIGHT HON. LORD CHARLES W. BERESFORD, R.N.

IN reading a paper to this Institution on "Machine Guns in the Field," I feel, as a naval officer, a certain amount of hesitation in taking up a question which perhaps the officers of the army might naturally think peculiarly their own; at the same time it must be remembered that the navy has had more actual experience in the working of machine guns in the field than any other branch of Her Majesty's service; and guns for this purpose are supplied to the naval service, but not to the army. After Colonel Sir Charles Nugent's most admirable papers on "Imperial Defense," in which he treats of the speed and manœuvring of war vessels, I indulge in a hope that the question of machine guns in the field will arouse a great interest in the sister service, although it is brought forward by a naval officer. It is not my intention to trespass upon the ground which belongs exclusively to the army, by giving an opinion as to which branch of the military service machine guns should be attached, or how they should be used; I merely propose to state a number of facts, repeat a number of opinions which have been given on this subject, make a few suggestions, and invite criticism on those facts, opinions, and suggestions.

---

[1] Read before the Royal United Service Institution.

A machine gun proper is a gun without recoil, in other words, a gun which does not require relaying after every shot; and there are two entirely distinct kinds of such guns,—the one a shell-firing gun, and the other a bullet-firing or rifle-calibre gun. International law does not admit any explosive projectile under fourteen ounces in weight, which would mean about one and a quarter inch diameter, and the weight of a machine gun throwing such a projectile would detract from its value as a machine gun, making it almost artillery.

An army has a recognized proportion of field artillery to every thousand men, and it is hardly likely that any general would care to increase or decrease that proportion by a new weapon so nearly allied to artillery as a machine gun throwing shell would be. Opinions have been expressed as to whether two batteries of light 3-pounder machine guns would not be more generally useful than one battery of 6-pounders, but many considerations have to be thought out besides the apparent advantage of having twelve light guns in action instead of six of heavier calibre.

The number of horses, ammunition, wagons, space on the march, space in camp, etc., are difficult questions well known to all generals commanding and officers in the army, who, I believe, do not question the superiority for general purposes of a battery of 6- or 12-pounders over two batteries of half their calibre. I mention this to show why, in this paper, I do not touch on machine guns of such a character, but confine myself to the small-bore rifle-calibre gun. In all the late wars that England has been engaged, the machine guns throwing bullets have taken an active and prominent part, and although all opinions agree as to their merit for defensive purposes, opinions differ considerably as to their value for attack. The German decision of fifteen years ago—expressed by saying, "the artillery don't want it, and the infantry won't have it"—still finds favor with the many, notwithstanding the immense improvements in accuracy, lightness, and rapidity of fire this class of gun now possesses over the old French mitrailleurs. At the commencement of the Franco-German war in 1870 the new mitrailleur was talked about in whispers; it was said it was the most deadly weapon that had ever been invented; stories were told as to the extraordinary result of the experiments it had been subjected to. No doubt all this was correct so far as private practice went, but what occurred when war broke out? Whole batteries were manned by men and officers who had never worked or even seen this new and complicated war machine (this alone was enough to invite a disaster); they engaged artillery at distances which were beyond the mitrailleur range, and were immediately punished severely by the artillery, and placed out of action in a very few rounds. Their equipment, mounting, and organization were precisely the same as a field battery, showing quite as large a target; and they always endeavored to use them as guns instead of as clusters of rifles, which they really were. In fact there was no possible mistake which the French did not commit with their mitrailleurs in the earlier part of the war; and it was not until later that the man-killing power of these guns was fully proved. It is worth while quoting a few examples.

The Duke of Würtemburg, in a description of the battle of St. Privat, says,—

"During the action at Ste. Marie-aux-Chênes, Prince Hohenlohe, commanding the artillery of the Guard, had collected eighty-four guns opposite St. Privat, and cannonaded the French position with great effect, at first at two thousand six hundred and forty paces, and afterwards at two thousand paces. About five o'clock in the afternoon the commander of the Guard considered the enemy to be sufficiently shaken for him to risk an assault across the open and gently ascending ground. The fourth brigade of the Guard (Kessel) first moved forward from Habonville in the direction of St. Privat, in line of columns in two lines, with skirmishers thrown out in front; and a quarter of an hour later the advance of the first division of the Guard (Pape) commenced in the same formation from Ste. Marie-aux-Chênes, distant about two thousand six hundred and forty paces from the main French position. Habonville is about three thousand nine hundred and sixty paces, therefore the three brigades came about the same time within the effective reach of the enemy's fire. The front of attack included little more than two thousand paces, so that there were about ten men to the pace. This was, however, the closest formation of attack employed by the Prussians in the campaign.

"*The effect of the enemy's fire even at a distance of more than fifteen hundred paces was so murderous, that according to the accounts received nearly six thousand men fell in ten minutes, and the advance had to be immediately discontinued.*"

The battle of Mars-la-Tour affords another example. A Prussian infantry brigade supported by the Second Heavy Battery advanced against Grenier's division. The official account is as follows:

"In passing over the bare hill-side which falls at first with a gentle slope to the oft-mentioned valley in front of the French position, the troops were received with a murderous musketry and mitrailleuse fire. Upon this the second line moved up to the skirmishing line to fill the vacancies in the rapidly thinned ranks, and then these companies proceeded to make alternate rushes of one hundred to one hundred and fifty paces. All five battalions at length came within thirty paces of the French line. A withering volley is poured in, but the brave battalions are forced to fall back into the valley beneath, and the fire of the adversary from mitrailleuses advancing to the crest increases the losses *almost to annihilation*. Cavalry were then pushed forward by the Prussians to protect the shattered remnant; but *on account of the violent mitrailleuse* fire the leader was unable to deliver home his attack."

The five battalions of the Thirty-eighth Brigade, which went into action with ninety-five officers and four thousand five hundred and forty-six men, sustained a loss of seventy-two officers and two thousand five hundred and forty-two men killed, wounded, and prisoners. The proportions between killed and wounded being 3 to 4!

In fact, on the few occasions in which the mitrailleur came into action in a position in which a machine gun would be useful, its effect was simply devastating, although the French handled them so badly. The Prussians never lost an opportunity of decrying the mitrailleur, but was it not likely that that was done to diminish the fear their own men might have of them? and it is most probable that, as they invariably brought their field artillery fire to bear upon the mitrailleur batteries in preference to other opposing forces, they thought it safest to silence them at once.

Opinions seem unanimous as to the value of machine guns for defensive purposes; the moral effect of their fire in repelling an assault is unquestionable, because of there being no time for the enemy to advance between the discharges; their accuracy within limits of range; the certainty of being able to fire with great rapidity if needed; the few men required to work them; and the very small target they present for an enemy to get his sights on. How useful a few guns of this description would be in defending earthworks or villages, captured positions, houses, bridges, plantations, or even for holding advanced posts; and in a war how much would depend upon holding certain positions such as those mentioned! Within their range their power of pumping or raining bullets would have as great a moral effect as the firing of shell from a proportionate number of artillery, and the bullet fire would be more continuous than either shell or shrapnel.

During the recent trials at Poona of a Nordenfelt 10-barreled gun, served by six men, the results, as shown in a four minutes' test, by the hits (taking an average), were equal to the fire of seventy men with rifles, and eighty per cent. better than the hits from four 7-pounder mountain guns. The importance of the use of vertical fire from such a gun was also shown. Colonel Holberton describes how, during these trials, a canvas sheet one hundred by fifty yards was pegged down upon the slope of a Deccan hill, presenting at seventeen hundred yards the semblance of a road, upon which a small flag was flying. Extemporized means for finding the elevation were resorted to, but after this had been once obtained, two hundred and ninety-three hits resulted from a discharge of three hundred bullets. Surely this is most effective practice. Two such guns therefore might hold a position that would require one hundred and forty men, but the guns would have the advantage of showing a smaller target, of far greater accuracy of fire, as the machine gun has no nerves and does not want relaying after every shot; while the arrangement for spreading the fire laterally is excellent, and the vibration allows it to do its own work in spreading bullets vertically. In addition to the foregoing advantages, as it takes up so small a space, it would be most valuable in short flanks, or where there was a limited front, which, from want of room, no infantry could command with the same deadly fire. For holding or clearing a street or a gap these guns are perfect, as was exemplified in the work of the Gatlings and Gardners with the landing party at Alexandria in 1882.

I will now approach a question about which many arguments and contrary opinions have been expressed, that is, whether these guns should be attached to the artillery, the cavalry, or the infantry. As a seaman, I will not venture to give my own opinion on a question so essentially a military one, but will give a few opinions I have received from officers attached to different arms of the service, some of whom, while approving of the machine gun, are doubtful whether it could be attached to the arm they represent, but all of whom admit its utility under certain conditions.

A colonel commanding an infantry regiment in India writes as to the use of machine guns:

"They could on all occasions be used as an escort for artillery. The conditions of modern warfare necessitate that the assault on a position must be preceded by a heavy artillery fire, sustained almost up to the moment of actual collision. It follows, therefore, that for the proper and effectual performance of this duty the artillery must move well away and act from a flank, as no infantry in the world will stand artillery firing over their heads for any time. This being so, necessitates the employment of a large escort, and there can be no doubt, if you could move infantry about quick enough, it is the best of all arms for such work. You cannot transport infantry with sufficient rapidity, and therefore in most instances cavalry takes the duty. Now if you can mount and move machine guns as fast and over the same ground as artillery, what better escort could they have, as to all intents and purposes they would have always on their exposed flank as many infantry as may be considered necessary? Before moving into position, of course cavalry would have closely reconnoitred and searched the ground selected for the massed artillery to act from; but once having done this, they could safely leave the artillery protected by the machine gun, and be free for other employment on other portions of the scene of action. Had there been a couple of 10-barrel Nordenfelt guns with the artillery at Maiwand, the guns would never have been lost, the cavalry would never have been kept so many hours inactive under a heavy artillery fire, and the day would have been saved." He goes on to say,—

"With cavalry and mounted infantry machine guns would be invaluable. Cavalry, to be of any use, must, in an enemy's country, be a long way ahead of the infantry and the rest of the army, and this distance is only limited because cavalry is not a self-contained arm. With two 10-barrel Nordenfelts permanently posted to each regiment, which can manœuvre and move with it, how economically yet how enormously has the power of cavalry increased! It has practically always with it one hundred and fifty infantry who can be brought into action at any moment, and not a single man has to dismount. They are all in the saddle ready to complete any advantage gained by their machine guns.

"Fancy the advanced cavalry of a large force armed as above working against an enemy's cavalry having no such adjuncts. The result is obvious, and the force with the adjuncts would assuredly penetrate the enemy's cavalry screen, get at the main body and hurl it back on to its infantry a disordered mass. I think few will contend that a brigade of cavalry of three regiments with six machine guns, representing four hundred and fifty infantry, would not overwhelm a much larger force without machine guns. Both sides would naturally be provided with horse artillery, but being of necessity without artificial cover, I maintain that you could (ground being favorable) work the machine guns up to within their own range of such artillery, and they would, as infantry would do, drive them out of the field.

"To me it appears as if cavalry is the arm which will profit most by the introduction of machine guns. It will, to them, supply a long-felt want, and will render them a self-contained force . . . Being infantry without nerves, they will find a happy home and welcome in this portion of an army.

"It seems to me that these guns are bound to be an all-important factor in deciding the result of the next big European war; and the nation which employs them, and thoroughly understands their technical working and organization, will assuredly come off victor. The result will be, if anything, more electrical and startling than the defeat of the Austrians by the Prussians in 1866: a fact which was entirely due to the superiority of an indifferent breech-loader over a good muzzle-loading rifle."

A colonel of artillery gives his views as to the use of machine guns as adjuncts to batteries when escorts are not available:

"A machine gun to be of any use for this purpose must be able to manœuvre at the same pace as the battery which it supports. With mountain and heavy batteries, whose pace is a walk, this is perfectly possible by carrying the guns on pack animals. To batteries of this class I think they would be valuable auxiliaries.

"For mountain artillery they would be specially suitable. They would greatly increase offensive and defensive power at ranges from one hundred to fifteen hundred yards. Their chief use would be the defense and attack of defiles, the defense of small fortified posts such as we held in the line of communications in Southern Afghanistan, and in repelling attacks at close quarters, as at Ahmed Keyl and Maiwand. There is the more reason for their use here, that the shrapnel fire of these batteries is weak.

"For horse and field batteries the problem is more difficult. No toy carriage with small wheels can be relied on for transport purposes. Such a carriage can be used and should be used as a fighting carriage for a machine gun in the same way as it is used in the mountain artillery. If, however, a very light gun with a good tripod arrangement, such as the 3-barrel Nordenfelt, were introduced, it is possible that the tripod might take the place of wheels, since both gun and tripod can be carried about quickly by the detachment.

"The great difficulty of working machine guns with horse and field batteries appears to me to be this: How can you transport them so as to be suitable for rapid movements under service conditions? It comes to this,—you must carry them about on carriages and wheels which shall not be less strong than the other carriages of your equipment. No system of carrying them on our already fully-weighted gun or ammunition carriages will answer. They must have a separate equipment, and this means an addition to the officers, men, and horses of your battery. Unless this is conceded, it is hopeless to think of machine guns as auxiliaries to field artillery."

A colonel of the Royal Engineers says, "About the tactical employment of the machine guns I have thought a good deal, and my strong opinion is, that if they are adopted they cannot possibly be attached as an integral part to either cavalry requirements, artillery batteries, or infantry battalions, and that they must either be kept in batteries by themselves (which would be the most satisfactory plan), or else be handed over to the Royal Engineer companies.

"I cannot conceive their being permanently attached to cavalry or artillery without constantly hampering them, as it would only be on rare occasions that they would be required; on these occasions they would always be available. Until they are made much more formidable than they seem to be at present, I do not see how they can possibly take the place of an escort for artillery. . . There is a good deal to say in favor of their being in charge of Royal Engineer companies. They could thus be introduced without an increased establishment, and consequently expense, except for home, as at the times when they would be required for action sappers would usually be unemployed in the reserve, and could spare the gun detachments necessary to work them. Also it seems to be universally admitted that whatever the value of the machine gun under other circumstances, it is without doubt specially suited for flanking the ditch of a fort, and for other employment in connection with defensive works, and here there would always be sappers available to work them. I am aware that at times, especially in offensive actions, every sapper is required for his own work at the front, but this work would very generally be the strengthening of a position, village, etc., just carried, and here the machine gun in the hands of sappers might be invaluable."

Lord Chelmsford writes: "On the advance to the relief of Ekowe, two Gatling guns accompanied the column, and at the battle of Ginginhlovo did considerable execution amongst the Zulus *at the opening of their attack*, which commenced on the north side of our position. The Zulus very soon, however, worked round to the west and south side of our laager, and the Gatlings were not in action therefore for any length of time.

"At Ulundi we also had two Gatlings in the centre of the front face of our square. They jammed several times in the action, but when in work proved a very valuable addition to the strength of our defense on that flank. Machine guns are, I consider, most valuable weapons for expeditions such as that which we had to undertake in Zululand, where the odds against us must necessarily be great, and where it is necessary to leave small detachments in charge of posts along the line of communications. The Gatlings, however, required too much care in firing, and could not be intrusted to any but skilled manipulators; if a machine gun can be invented that may safely be intrusted to infantry soldiers to work, and could be fired very much as one grinds an organ, I am satisfied of its great value. They should, however, in my opinion, not be attached to artillery, but should be considered as essentially an infantry weapon, and should be worked by infantry soldiers; so utilized, they might, I feel sure, be used most effectively, not only in defense, but *in covering* the last stage of an infantry *attack* upon a position, where the troops have at last to cease firing and endeavor to get home with the bayonet."

The present Gatling gun is such an improvement on the old one that there is no comparison. It is a most formidable weapon, its power of firing at any angle of elevation or depression being unrivaled.

It will be perceived that the opinions quoted are from officers commanding different military branches of the service. I have got many more opinions, but I have not room to enter them in the lecture. Generals Sir Donald Stewart, Sir Frederick Roberts, General Hardinge, etc., all have written to me, stating that they believe there is a great future for machine guns under certain conditions. Lord Wolseley also says that he believes there is a great future for them. Naval officers have the highest opinion of their utility for landing, both for offensive and defensive purposes.

It would appear from these opinions, as well as from others that have been given on the question of machine guns in the field in recent lectures and otherwise, that the main point to be considered is, how they are to be mounted. It has often been said a machine gun in such and such a position would be invaluable, either by itself working independently or attached to one of the arms of the service; the difficulty appears to be to have them mounted in a manner to suit all the varied requirements of the cases and places where it is acknowledged they might be useful. This being so, I would suggest that there are two sorts of mounting applicable to them for service in the field; the one mounted on a galloping carriage which could accompany with ease mounted infantry, cavalry, or artillery, or work independently, or in divisions, half-batteries, or batteries; the other mounted as a weapon to accompany the infantry, as the present machine guns supplied to the navy are. I may here mention that I do not propose to enter into the question as to which of the rival machine guns is the best, but shall refer impartially to Nordenfelts, Gardners, or Gatlings.

I will first explain what I mean by the galloping carriage, which is a suggestion of my own carried into effect by Mr. Nordenfelt (though applicable to other guns), and then propose what I hope may be considered improvements in the mounting of machine guns supplied to the navy for landing purposes.

A machine gun mounted on a galloping carriage would bear a great resemblance to a torpedo-boat as far as the deadly and devastating power it possesses in a small compass, and the ease with which it could be transported at great speed to any position where its deadly power might retrieve a disaster or make victory certain. Like a torpedo-boat, there must be occasions where great risks would have to be run, but supposing it succeeds in its undertaking, it would be well worth any risk whatever. A galloping machine gun, however, has a far better chance of being able to do its destroying work than the torpedo-boat, and if it should fail there is less cost in men and material. It should be capable of being instantly put into action, and by so doing act up to the theory advanced by artillerymen, that the most efficient gun is that which can go into action first and remain there the longest; it should be able to fire immediately on halting, and have as nearly as possible an all-round fire. Its mounting should be so light that horses could gallop at their top speed with it, and it should be strong enough to gallop over any rough ground, and stand the racket of a campaign as well as artillery. When needed, it is also possible to gallop up to a position, unlimber, and fire the gun under the same conditions as an ordinary field-piece in action with the trail on the ground. This might be found useful on many occasions where natural cover could be found, though a very little earth thrown up would make plenty of cover for so small an object as the gun unlimbered. The carriage is so constructed that it can reverse in the narrowest lane without unlimbering. The gun mounted on the galloping carriage I have suggested, has each and all of these requirements; the gun and limber are combined in one on a four-wheeled carriage (by which means the gun is always in action, and no time is lost in unlimbering), the gun being on the rear, and ammunition boxes on the front axle. The gun is mounted so as to have an all-round fire, as its pivot allows it to train above the wheels, and so it is ready for action, and can commence firing the very instant the carriage is halted, or even while the carriage is still in motion. With a 5-barreled Nordenfelt mounted in this way, it would be possible to gallop to a position and immediately open fire at the rate of six hundred rounds a minute, or with a 10-barreled Nordenfelt at the rate of one thousand rounds a minute, and it can remain in a position to the last possible moment, as it is always in action, firing if need be as it retires. How useful such a gun would be for covering a retreat! Last July there was a trial at Dartford of a 5-barreled Nordenfelt gun mounted in the manner described; it was drawn by two horses which were driven, not ridden; it fired a total of three hundred and fifty rounds from seven stations during a run of two-thirds of a mile, advancing and retiring under cover against troops supposed to occupy a farm; the time occupied was five minutes and fifty-five seconds including the halts, which were long enough to fire fifty rounds from each station, and the last few hundred yards of the distance was galloped up a steep hill. From the small space the gun occupied, and the light nature of itself and its carriage, which was painted gray, it was barely recognizable to the naked eye at three hundred yards on the grass, so it showed practically no target, a great matter in these days of precision with war machines.

This was only an experiment, but it shows what can be done. On service such a gun, with the ten thousand rounds of ammunition with which it ought to be supplied, would require more than two horses, its total weight being 22 cwt. 0 qrs. 16 lbs.; but I will not give an opinion as to how such a weapon should be horsed or driven, as that is more an artilleryman's question than a seaman's, and I am now merely suggesting the mounting for the weapon. There is a light shield placed upon the limber or ammunition box which would protect the drivers and, to some extent, the horses when the gun is in action, as most probably their heads would be turned away from the direction of the enemy's fire when halted. A machine gun on a galloping carriage would always be more or less on the move, which would lessen the chances of its being destroyed by artillery fire.

In warfare there is nothing that has so demoralizing an effect as a sudden attack when combined with rapidity of fire; surely this effect can be obtained most certainly by a machine gun mounted on such a galloping carriage, which is equivalent to a company of infantry in its rate of fire, has greater rapidity as well as accuracy of delivery, and whose mobility must necessarily be far greater than that of a company of infantry. I recently sent a carriage of this description (with a 5-barrel Nordenfelt mounted on it) to Sir Donald Stewart in India for a trial, who had kindly offered to try it for me. I hear it has been galloped over rough ground with a pair of horses against a piece of artillery with a team of six horses, and that the trial was most satisfactory. A gun possessing the offensive and defensive power which a rifle-calibre machine gun of whatever system is acknowledged to possess, mounted in the way I suggest, might possibly commend itself to officers of the different arms in the service.

Weight of 5-barrel Nordenfelt complete, on the galloping carriage, with 10,000 rounds of ammunition— 22 cwt. 0 qrs. 16 lbs.	Weight of 7-pounder service gun (steel), muzzle-loading, with carriage, limber, and ammunition complete, is 25 cwt. 2 qrs. 27 lbs.

I will give a few engagements in which English troops have been fighting in late years where a machine gun mounted as described would have been of infinite service. In the Afghan war, at the battle of Charasiab, 6th October, 1879, nearly the whole of the infantry were employed, and necessarily the cavalry were held in reserve for the protection of the camp, thus their services during the flight of the Afghans were lost. Machine guns might have supplied the place of the cavalry for this purpose. There were two Gatling guns employed to cover the advance of the Fifth Goorkhas to attack a certain hill, but they were soon put out of action by the "drums" jamming. At the Afghan attack on the Sherpur cantonment, 23d December, 1879, machine guns would for this defense have been of great value, as the attacking force were obliged to pass over clear open ground in their assaults. The weak part of the defense between the field hospital and the Behmaru village could have been greatly strengthened by machine guns. At Ahmed Khel, 19th April, 1880, a large force of Ghazis made a furious attack on our troops whilst in the act of forming up, which nearly ended most disastrously. Machine guns, nerveless, and with great rapidity of fire, would have checked or repulsed the rush of the Ghazis, the last three hundred yards of rush being over open ground. At Maiwand, later on, if machine guns had been used in place of the six smooth-bores, the result of this affair would have been materially altered, by reason of their power to stop rushes of men, and by their not suffering from the effect of demoralization.

The Zulu war afforded a splendid opportunity for the employment of rifle-calibre machine guns having great *portability*, certainty of action, etc., as the Zulus attacked in masses, and the ground was generally open and favorable to such fire. In the assault and subsequent destruction of our camp at Isandwhlana, these guns must have proved invaluable, as there was time afforded to temporarily intrench them, even if not placed within the laager. The defense of Rorke's Drift, and the massacre at the Intombi River, might have had different results with the assistance of such guns. At Ulundi, machine guns *that could have rapidly and easily moved from point to point* of the square as the attack developed itself, would have been of great assistance in addition to the Gatlings used there. At Majuba Hill in the Transvaal two machine guns would have been the means of checking and repulsing the final fatal rush of the Boers, had the guns been light and portable enough to have been carried up the hill.

I will now turn to the mounting of the machine guns as supplied to the navy for landing purposes. With this gun (as with the galloping gun I have mentioned), to be thoroughly effective, it should always be ready,—that is, always in action. Limbering and unlimbering does away with much of its utility as a machine gun; the limber adds to its weight, it is not ready for instant action, and the fact of having to unlimber hurriedly must tend to make the men unsteady, especially if under fire. Absolute steadiness and perfect self-control is essential for the success of machine gun fire. Another weak point in the service fitting is the fact of having to lift the trail of the gun by order "Trail right" or "Trail left," to get the training on. This takes time, and throws the elevation out. A machine gun should be able to get its training on in nearly every direction without touching the trail, and to do this it should be pivoted on the axle, so as to enable it to train above the wheels.

In support of this argument, I may quote from a letter I received from Admiral Sir William Hewett relative to the machine gun mounting: "At the battle of El Teb," he says, "the Gardners belonging to the 'Sphinx' were fitted to the 7-pounder gun carriages with a plate; this brought the machine gun clear of the wheel, and a man could turn the fire round without moving the gun carriage; in fact, no trail training. The chief engineer of the 'Sphinx' fitted their machine guns in this way, and they were a great improvement on the service fitting, of which we had one belonging to the 'Monarch.' This carriage did not allow the gun to train all round, so it was the old thing of right or left; besides, with those fitted high the barrel was just up to a man's shoulder." Commander Rolfe, who commanded the naval brigade in the Soudan, also writes me: "The service mounting of the Gardner is open to a good deal of criticism; it is too low, and the gun has to be trained by the trail instead of the screw. It is most necessary to be able to fine train; and when it is considered that it is the most delicate rifle fire, you cannot have your training screw too fine."

It would be better to do away with the limber altogether for the naval gun mounted for landing purposes. It is far too heavy, making a vast amount of unnecessary weight for the men to drag, and the gun being limbered up prevents it being always in action, which detracts from its value as a machine gun. There is everything to say against it, and nothing to say in its favor. Men, horses, or mules could easily carry the ammunition for the guns, and they would be far more efficient if this were done; the wheels of the present carriage are not large enough in diameter, neither are the tires wide enough. I will here read a letter received from Captain Wilson, V. C., which bears out in many particulars the remarks made on these matters, and gives some excellent suggestions founded upon actual experience in the late fighting in the Soudan. "At El Teb the whole advance was necessarily made in fighting formation. The square was expected to be able to withstand a rush at any moment; a team of animals under these circumstances would have been very unsuitable; even with men the space required for reversing the limbers entailed considerable gaps in the square, which had to be rectified afterwards; but with animals these gaps would have been much larger, and the time occupied much greater. In either case the operation of unlimbering and coming into action is attended with a certain amount of confusion at a moment when the most perfect order is required; when the square halted at nine hundred yards from the enemy's position, the practice from the Gardner gun of the left half-battery which then came into action was admirable. The practice at this period I look on as illustrating one of the best uses of machine guns. The whole square lying down, that is, under the best cover that the circumstances admit of, not a single man wasted a cartridge, and the machine gun quietly delivered a fire under the most perfect control, which must at that range have been equivalent as regards actual effect to the fire of not less than one hundred marksmen. As soon as the advance against the enemy's works was commenced, the defects of our present system of mounting at once became apparent. The left half-battery then formed the right of the leading face of the square. To advance it was necessary to limber up, and this not only prevented them from firing, but what was worse, it made what was practically a gap in the front of the square. A rush of Arabs when they were close up to the enemy's guns showed very distinctly the danger of this arrangement, as it compelled the guns to come into action in a hurry just when a steady front was required. Fortunately, the number of Arabs was small at that point, or the position might have been an awkward one. The necessity for ever limbering up a machine gun in action appears to me to be fatal to its efficient use. It is bad enough with artillery, whose work ends at about the ranges where that of rifles and machine guns begins. With weapons that are expected to fight at close quarters the system is quite inadmissible. I strongly recommend doing away with the limber entirely, using pack animals or men to carry the ammunition, and making the gun always travel independently. The weight of the limber for the 5-barreled Gardner gun packed is 6 cwt. 2 qrs. 3 lbs., while that of the gun and carriage with feeder filled is 6 cwt. 0 qrs. 23 lbs. Doing away with the limber therefore saves half the weight to be dragged, and the weight will run easier on two wheels than on four. The actual weight of ammunition and holders carried in the limber is only 1 cwt. 3 qrs. 25 lbs. (say 2 cwt.), so that the empty limber weighs more than twice as much as the ammunition it can carry. To have a cart weighing more than twice as much as its load must be a mistake, especially when it is expected to travel over rough ground. Two pack mules could easily carry the twelve hundred rounds which the limber contains. Suitable panniers should be made to strap on to an ordinary pack saddle, each pannier fitted to take six holders containing fifty cartridges each. I should make them in three divisions for strength, each division to take two holders, which should have handles on the top to lift them out by. It should not be necessary to take off the panniers to get at the holders, but they should be easily removable, to save the animals during halts. The weight of each holder filled is nine pounds, so each mule load would be one hundred and eight pounds plus the weight of panniers and pack saddle. A mule can easily carry one hundred and sixty pounds, exclusive of saddle, so there is a considerable margin left.

"To make the gun travel easily by itself, I should propose to take off the present trail and substitute two stout shafts, thus making the carriage simply a two-wheeled cart without any body. In the firing position the shafts would rest on the ground, and although on rough ground only one would be generally touching the ground, I think that would be enough to steady the gun, as there is no recoil. The wheels should also be made a foot larger in diameter than they are at present, and the tires at least an inch wider.

"In action the gun should always advance muzzle first, two men on each shaft pushing, and two men on each side with short drag ropes pulling; the feeder always on the gun. It is then instantly ready for action by merely dropping the shafts. On a long march, when not liable to surprise, a single mule or horse may be put into the shafts, and the gun may travel breech first; or if there are no animals, the covering party, which I think should always be with the gun, should take half-hour spells at the drag ropes.

"The disadvantages of being caught limbered up, as I have described, were evidently felt, as the guns did not attempt to limber up again during the remainder of the action.

"I was much impressed with the ease with which the fire of these guns could be directed or controlled by the officer in command, in comparison with the rifle fire of both soldiers and blue-jackets. The men were at this time very excited, the noise and general confusion preventing orders from being heard; mounted officers rode furiously up and down the line with little effect, while the bugles almost continually sounding 'cease firing' seemed only to add to the noise; but the machine guns were under perfect control. Orders quietly given to 'search out that clump of bush,' 'keep your gun bearing on that corner of the wall,' or 'cease firing till they show again,' etc., were carried out with the greatest regularity.

"Each machine gun should have its own covering party, as it cannot defend itself at close quarters. On this occasion their own guns' crews were split in half, one-half being with the limbers, and the rest with the guns, and they were swept away with much greater ease than if each gun had had a compact party specially told off to defend it . . . While the gun is encumbered with a limber you cannot make it conform to all the movements of a company, and it would only create confusion to attempt it; but with the gun alone, fitted as I propose, I think it could be done with ease and with great effect."

I will now refer to the question of ammunition. It should be imperative that every rifle-calibre machine gun supplied to either service should throw the same ammunition as the service rifles; unless this is done, endless and needless trouble and confusion may arise on a campaign, and indeed a fearful disaster might occur, as these remarks of Commander Rolfe to myself exemplify. Commander Rolfe says,—

"When we got to Tokai I sent back for a further supply of ammunition, which came up by convoy, but I found one box short. As I was walking about the camp I found an empty box of Gatling cartridges in one of the regimental lines; knowing that no infantry regiment had any business with such a box, I went to the commanding officer and told him that I thought he had got some machine gun ammunition. On the pouches being examined, nearly all my missing cartridges were found. The result of this comparatively harmless peculation might have been most serious, as you can get the machine gun cartridge *into* a rifle, but it's an awful job to extract the empty cartridge.

"Such a mixture of ammunition might in this instance have resulted in practically spiking every rifle in a regiment, and caused a panic."

The machine guns which I sent to India last spring for trial all fired the Martini-Henry Boxer cartridge without any trouble from jamming, feeding, or extracting.

That the machine guns of the present day are accurate, rapid in their fire, and terrible in their man-killing power is beyond doubt; whether they can or cannot be better utilized for the services is a grave question for consideration. For volunteers they would appear admirably adapted, and the London corps under Colonel Alt have lately demonstrated (as far as drill can do, and in the recent sham fight at Portsmouth) how exceedingly useful they might be. Artillery officers as a rule are supposed not to look upon them with favor, but most of the arguments used against them appear to treat them as guns instead of clusters of rifles, which they really are. I have endeavored in this paper not to obtrude my opinions too strongly on a question which is more perhaps of a military character than a naval one. Confidence in the immediate future of these guns induced me to read it, and it would have been impossible to have approached the subject without trespassing slightly on military ground.

GERMAN MILITARY PUNISHMENT.

BY C. J. L'ESTRANGE.

(Concluded from page 201.)

THE regulations for imprisonment, with which form of punishment we concluded our notice last month, are as follows:

a. The prisoner must be confined in a military fortress.

b. Imprisonment can be solitary; but solitude must not be enforced for more than three years without the consent of the prisoner.

c. If the prisoner demand employment, it must be furnished him. Non-commissioned officers and men may be employed outside the prison without their own consent.

d. Such employment must suit the capabilities of the different prisoners, must tend as far as possible to military ends, and be carried out under military supervision.

The duration of an imprisonment amounting to more than six weeks is not included in the period which the prisoner is bound by law to serve.

Fortress confinement, the maximum and minimum duration of which is, as in the case of imprisonment, fixed by law, may be found, in one form or another, in all codes of military punishment. It is, as already said, the *custodia honesta,* and enforced exclusively against officers whose offense does not involve dismissal from service. It forms also a part of the civil code, in the punishment of misdemeanors not implying a loss of honor, as, for example, dueling; though incitement to a duel by a third party is always followed by imprisonment. An officer sentenced to fortress confinement is employed under military supervision in those duties to which he is best fitted, although the rules and regulations under which he works are very much less stringent than in the case of imprisonment.

The third military punishment in the form of restriction on liberty is arrest. The civil code does not contain this penalty; but it forms one of the most effective punishments ever devised to meet the special conditions of military life. Army punishments should be short and severe as possible. In expiating a military misdemeanor, the soldier should not if possible remain long away from his duties. Military punishment must not be made a means of shirking military obligations. Arrest, therefore, has been so devised as to involve during a short space of time a number of severities and hardships, both moral and physical, calculated to subdue without hardening the prisoner. The form of arrest depends in the German as in other services on the rank of the offender and the nature of his offense. To punish an officer in the same manner as a private would be as damaging to the influence and self-respect of the one as to the discipline and subordination of the other. Furthermore, it is not necessary to employ against an officer the stringent measures often necessary with the private. He feels the slightest punishment as a stain upon his honor; and this consideration has far more effect than the greatest severities. If severe measures be needful in any particular case, it is apparent that the offender is not worthy or fit for his rank. The same rule applies with almost equal force to the non-commissioned officer.

In accordance with such considerations, the framers of the *Militär-Strafgesetzbuch* have divided arrest into four distinct forms: room arrest, slight arrest, moderate arrest, and severe arrest; and the cases in which each is to be enforced are specifically laid down. It may be remarked that the German code of punishment does not recognize barrack or quarter arrest as a *Freiheits-strafe* or liberty punishment. These forms of arrest are only regarded as disciplinary penalties, and may not be employed for such offenses as are threatened by law with punishment. The minimum length of arrest is one day, the maximum six weeks; of severe arrest, four weeks. Room arrest is only enforced against officers; light arrest against non-commissioned officers and men; moderate arrest against non-commissioned officers, without *port-épée*, and privates; while severe arrest is only employed as a punishment for privates who have already undergone a period of imprisonment with hard labor for a military crime.

In room arrest the offender is confined to his own quarters. He is not allowed to leave them without permission, nor to receive visitors. When arrest is enforced against captains or subalterns, a particular room may be set apart for the purpose; but in this event it is called severe room arrest, and is a judicial, not a disciplinary, punishment. During room arrest, as during all similar restrictions on liberty, the offending officer can neither carry arms nor wear any decorations which he may possess. When, however, he has obtained permission to leave his room he is allowed to carry his sword. When an officer is sentenced to room arrest his sword is received by another and delivered over to the governor or commandant of the fort. In simple room arrest, however, a superior officer exercising the least disciplinary power receives and retains his arms. This duty usually falls to the adjutant; but if he be not present the arms may remain in the house or apartments of the offender. In simple room arrest the officer is again confined to his own residence, and is not allowed to receive visitors. If, however, he occupy a house in common with other people, he may mix with them as usual. A married man, therefore, is not separated from his family; while the visits of his doctor are always allowed. Any doubtful points are decided by a superior officer, who in urgent cases may permit access to a few persons. Open-air exercise is usually allowed after the first fourteen days' confinement; but if his doctor declare such exercise to be essential to health before that time, the arrested officer is permitted to leave his house for an hour daily, under the supervision of an equal or superior in rank. The attention of every officer sentenced to simple room arrest is directed by a superior to a regulation in the *Militär-Strafgesetzbuch*, which says, "Any officer who during room arrest shall leave his quarters on his own responsibility will be punished with six months' imprisonment and dismissed from service. Any officer who during room arrest shall receive a visit on his own responsibility will be punished with six months' imprisonment, and in serious cases with dismissal from service." These laws are founded on the idea that we should be able to rely on the officer implicitly to obey regulations for the maintenance of discipline. If he do not, he betrays a sacred trust, and sets an example to inferiors in rank which must have the worst possible effects.

Severe room arrest is only enforced against captains or subalterns. The offender is confined in a special arrest-room and there locked in, though the use of books, pen, ink, and paper is allowed. Paragraph 79 of the *Militär-Strafgesetzbuch* contains the following: "A prisoner who on his own responsibility shall break from severe room arrest, will, if desertion from the colors be not charged against him, be sentenced to six months' imprisonment." It will be seen that the breaking of severe room arrest is not punished so sharply as escape from simple arrest, for in the latter case there is a breach of confidence deserving a very heavy penalty. It is apparent that the rule as to leaving his house or apartments "on his own responsibility" would not apply in the case of a fire, or any other danger to himself or to his family.

Slight, moderate, and severe arrest are always solitary. Solitude, in fact, is the chief characteristic of arrest; in imprisonment it is optional; in penal servitude it is not allowed. Experience proves that solitude is the best and safest mode of increasing the severity of a necessarily short punishment. In solitude the soldier has time and opportunity to chew the cud of reflection; while his loneliness is the more oppressive, as society has become a necessity of civilized life.

During arrest the soldier retains his uniform; in imprisonment and fortress confinement he receives prison clothes.

Slight arrest does not involve any other penalty than solitude. The soldier receives his usual pay, is allowed to read "good books," and smoke. The use of spirituous liquors in moderation is also permissible, if the maintenance of order be not thereby endangered.

Moderate arrest is enforced in a different manner. The offender receives a plank bed, and is fed on bread and water. These severities are dispensed with on the fourth, eighth, twelfth, and afterwards every third day. If needful to health, for example in cold weather, a breakfast of soup and at night a woolen covering are given to the prisoner, whose moral needs may be met by the perusal of the inevitable "good and improving" books.

During severe arrest the prisoner is confined in a dark cell under much the same conditions as those in force in moderate arrest. As in the latter, the severities are dispensed with on the fourth, eighth, twelfth, and afterwards on every third day. Severe arrest, of all restrictions on liberty, is probably the most effective and the most felt. Several days passed in a dark cell, in solitude, and on bread and water, exercise of course a startling effect on the mind and body of the most recalcitrant soldier. As, however, severe arrest is regarded as an exceptionally heavy punishment, it is only employed in the case of men who have already undergone one or more periods of imprisonment. It is usually used as a *dernier ressort* against those with whom all other modes of disciplinary punishment have failed; who must, in the German popular phraseology, undergo a course of softening—"*mürbe gemacht.*" The reduction of the maximum duration of severe arrest from six to four weeks may be ascribed to the general moderation of the *Reichs-Militär-Strafgesetzbuch* as compared with other and earlier codes of military punishment.

As the hardships involved in moderate and severe arrests are only really felt after several days, these forms of punishment are not usually enforced for less than three. A shorter period would have no practical effect. If the bodily health of a prisoner be likely seriously to suffer from the usual severities, a lighter form of arrest is resorted to. This regulation is founded on the idea that slight arrest will have as much effect on a man in bad health as its severer forms on a strong and hardy soldier.

As suitable places of confinement may not be procurable in the field, the manner in which different classes of military misdemeanants are to be treated in such an event is fully and explicitly laid down. In slight arrest the prisoner, when he would otherwise be off duty, is employed as sentry, but he is not docked of his field allowance. In moderate arrest he is given a number of exceptionally heavy and disagreeable duties. In severe arrest the prisoner is either bound for two hours a day, or obliged to carry a heavy weight of rifles or saddles. When sentenced to be bound, he is placed in such a manner, with his back to a wall or tree, that he can neither lie nor sit. When the carriage of rifles or saddles is to form his task, he is weighted, whilst walking or standing, with a burden of not more than fifteen kilogrammes, either entirely on one shoulder, or, unequally divided, on both. This burden may be composed of rifles, saddles, or other articles of equipment.

Being bound for two hours, or carrying a load of rifles or saddles, is reckoned as a day's severe arrest. In the field these hardships are dispensed with on the fourth, eighth, and afterwards on every third day. The place in which such punishments are to be enforced should be removed as far as possible from the eyes of the public. Moderate and severe arrests are, in war, a most effective form of punishment. Not only do they bend the will of the prisoner, but they exercise a strong deterrent effect upon the rougher spirits of the army in general. In peace such modifications are not admissible. The punishment of a misdemeanor during manœuvres takes place on the return to garrison.

Though, as has been said, death and imprisonment are the most effective and most universal of military punishments, the special conditions of military life render the existence of other essentially different penalties scarcely less important to the interests and well-being of the army. Honor and duty should go hand in hand; but their non-observance on the part of the soldier cannot be uniformly punished. Breaches of duty, as we have seen, are met in the German service either by death or imprisonment; breaches of honor usually entail dismissal from the army or the marine. Not only does a dishonorable action render a soldier unfit for the company of his fellows, but it reacts in a greater or less degree on the regiment, battalion, or troop to which he belongs, so close is, or should be, the *camaraderie* of soldiership. For such cases, therefore, punishments must be devised by which an offender may be stamped as dishonorable, dismissed the society for which he has proved himself unfit, whose rules he has broken, whose self-respect and mutual trust he has so gravely injured.

The special punishments of honor which can only be incurred as supplements to other penalties are the following: 1. (For all ranks), dismissal from the army or the marine. 2. (For officers), dismissal from service. 3. (For non-commissioned officers and men), degradation to the second class. 4. (For non-commissioned officers), reduction to the ranks.

I. Dismissal from the army or the marine must, in the case of non-commissioned officers and men, be the consequence of penal servitude or the loss of civil rights, when the latter penalty is to extend over more than three years. In the case of officers it must always follow a sentence of penal servitude or the loss of civil rights, without regard to the duration of the latter. It must also be enforced in those cases in which non-commissioned officers and men would be reduced to the second class. This punishment is designed for offenses that carry with them unworthiness to bear arms. They are as follows: Theft, embezzlement, robbery, extortion, receiving stolen goods, fraud, self-mutilation, cowardice, mutiny, pillaging, plundering, marauding, and deserting the colors. Dismissal from the army or the marine is not, in the case of non-commissioned officers and men, a necessary consequence of all these crimes. For officers, of course, it is the only satisfactory penalty. When so dismissed the offender naturally loses all his titles, orders, or decorations, as well as all military claims, and is incapable of re-entering the service.

II. Dismissal from service carries with it an incapability of filling any public office, and is enforced in those cases in which non-commissioned officers would be degraded. This punishment is used in cases where an action has been committed injurious to the position of the officer either as a comrade or a superior. It does not, for instance, follow that the offender has totally forfeited the respect of his brother-officers; but that his conduct has caused his retention on active service to be incompatible with the interests of discipline. He retains, therefore, his rank and decorations, but forfeits the right to wear his uniform, as well as all claims to pensions, etc., which he may have earned whilst on active service.

III. Degradation to the second class may be the consequence of theft, embezzlement, robbery, fraud, and similar offenses. Special regulations provide for the degradation of such recalcitrant soldiers who have undergone, without good effect, one judicial and several disciplinary punishments. This is affirmed to be one of the most effective concurrent punishments in force in the German army. The loss of his cockade stamps the offender as one who has acted in a dishonourable manner. Not only his comrades, but the general public can recognize this fact at a glance; and he must carry with him, therefore, a constant stinging and galling reminder of his conduct. The average soldier feels this above all other similar punishments; and if he have incurred it, will seek by exemplary conduct to rehabilitate himself in the respect of his companions and of the public, to whom he must form an object of curiosity and ridicule. This punishment is not limited to any definite period. By good conduct the soldier may regain the cockade whose absence makes him so conspicuous, but not the orders or decorations which he may have forfeited. For this latter purpose a special cabinet order would be necessary. This method of punishment was introduced into the Prussian service as far back as 3d August, 1808; and its practical value is still so great that it has been incorporated in the new *Reichs-Militär-Strafgesetzbuch.*

IV. Reduction to the ranks must be enforced against the non-commissioned officer after an imprisonment of more than one year, or when he is declared unfit to fill any public office. It is, however, optional, whether he be reduced after a period of imprisonment amounting to less than one year, or after a repetition of military offenses.

We have so far considered only those punishments that find a place in the *Militär-Strafgesetzbuch,* and are therefore judicial in their character. But there are other lesser disciplinary punishments which are often too trivial to be treated in such a work, or indeed to be looked upon in a judicial sense. Some offenses and their disciplinary punishments are, however, given in the official work, and among them we may mention:

1. Absence without leave, or exceeding one's leave in peace for seven, in war for three days.
2. Want of respect to a superior, or insubordination.
3. Falsehood on questions relating to service matters.
4. Disobedience of orders in not carrying the same out, exceeding or altering them, even should no military disaster ensue.
5. Abuse of rank in borrowing money or receiving presents from an inferior without the knowledge of the commanding officer.
6. Wilful damage or destruction of government stores or property.
7. Quitting one's post without leave during one's tour of duty.
8. Falling out without leave on the march.
9. Drunkenness on duty, and incapacity, from the effects of intemperance, to perform duty.

As they are included in the regulations of the *Militär-Strafgesetzbuch,* the enforcement of suitable disciplinary punishments does not assume the arbitrary or personal aspect which might otherwise be ascribed to it. For disciplinary purposes arrest only can be enforced, and in this case must not exceed four weeks of slight or room arrest, three of moderate, and two of severe arrest. The official regulations end at this point. Details are left to the judgment of those on whom the duty of enforcing these penalties may fall.

The disciplinary punishments are as follows:

A. For officers.

1. Reprimand.—(*a*) Simple, without witnesses, or in the presence of a superior in rank.
   (*b*) Formal, in the presence of the whole *corps d'officiers*.
   (*c*) Severe, published in orders.
2. Room arrest, not exceeding fourteen days.

B. For non-commissioned officers.

1. Reprimand.—(*a*) Simple, in the presence of a superior in rank.
   (*b*) Formal, in the presence of all the officers and non-commissioned officers of the company, etc.
   (*c*) Severe, published in orders.
2. Imposition of extra regimental duties.
3. Arrest.—(*a*) Barrack, quarter, or slight arrest, not exceeding four weeks.
   (*b*) Moderate arrest, not exceeding three weeks.

C. For privates, including corporals and lance-corporals.

1. Small disciplinary punishments.
   (*a*) Extra regimental duties,—*e.g.*, punishment drill, extra guards, punishment fatigue duty, stable duty, etc.
   (*b*) Restrictions on pay not to exceed four weeks.
   (*c*) Return to barracks before the ordinary hour of "Retreat," not to exceed four weeks.
2. Arrest.—(*a*) Barrack, quarter, or slight arrest, not to exceed four weeks.
   (*b*) Moderate arrest, not to exceed three weeks.
   (*c*) Severe arrest, not to exceed fourteen days.

3. (For privates of the second class after the aforementioned punishments have been enforced in vain.) Drafting them into a company of working laborers.

The exercise of the power of disciplinary punishment is only vested in officers who either command a company, preside over a military jurisdiction or institution, or have a separate command of their own, and are, therefore, answerable for its discipline and the maintenance of order. It begins with the captain of a company, and increases in extent and importance with the responsibility of the different ranks. The practical influence of disciplinary is found to be much greater than that of judicial punishment. The latter is only employed in grave cases, when expiation rather than education is the object. Before being sent before such a tribunal, all disciplinary punishments, all admonition, warning, and reprimand must have been tried in vain.

The military education of the army implies a complete subordination of the will of the individual to that of his superior in rank. Not only bad characters, but all men of strong individuality must object to, and more or less resist such subordination; and only the knowledge that the will of the superior can be made good by main force can insure the obedience of a large body of men. It is, then, all-important that punishment should follow as quickly and surely as possible on the offense committed. The few short words "Three days' severe arrest" from a commanding officer are far more effective than the roundabout procedure of judicial punishment. The individual power of his superior is thereby brought constantly and directly home to the soldier. But the power for good or evil vested in the hands of such an officer is so great, its exercise may be attended by results so widely divergent, that the attention of every officer in the German service is drawn by the authorities to the responsibility he assumes in accepting it: "Every officer holding the power of disciplinary punishment must use it with the most conscientious fairness and absence of bias. If either the nature of an offense, or the proper mode of punishment, be doubtful, he should seek by all the means in his power to obtain an oral or written statement of the whole affair. The manner and the measure of punishment must be decided by him with due consideration for the feelings of the offender, with reference to his previous conduct, and to the manner in which the interests of the service may have been affected. If officers be intrusted with functions not properly appertaining to their rank, they must nevertheless be guided by those functions in their choice of suitable punishments." These and other general principles must be thoroughly mastered by the German officer in order that he may act according to the spirit of his instructions,—*i.e.*, according to the judgment of the greatest soldiers of his age and country.

In order to make our sketch of German punishment the more complete, we may mention a third system, that of the *Ehrengerichte*, or courts of honor, for officers. Their punishments are of three kinds:

1. Warning.

2. Advising resignation.
3. Actual expulsion.

In carrying out this code of punishment the finding must run, "Guilty of injuring the honor of the community." This institution, it may be remarked, exercises an enormous influence over the conduct of the officers, and, therefore, over the tone of the whole army. It has no connection, however, with the judicial punishments included in the *Militär-Strafgesetzbuch;* so that an officer untouched by the one might be expelled the army by the other. The ultimate decision in these cases rests with the emperor.

Such are the salient points of a system of punishment to which the care and attention of the military authorities of Germany have been devoted during the last two centuries. Since the time of Frederick the Great, the requirements of discipline have been paramount in the minds of German officials; and the outcome is the publication of the *Reichs-Militär-Strafgesetzbuch*, which contains a code of punishment found perfectly satisfactory for the maintenance of discipline and order in the largest army in the world.

TORPEDO-BOAT WARFARE.

BY C. SLEEMAN, ESQ. (LATE R.N.).

(Concluded from page 252.)

A FIRST-CLASS ship of war, or fleet-ship, may find herself the subject of attack by one or more of the enemy's torpedo-boats, either when lying at anchor, or under way. In the former case the anchorage may be either a home naval port where special and exceptional means of defense are readily obtainable, or a harbor, roadstead, river, etc., where the ship will be forced to depend for her safe protection on her own resources; while in the latter case (under way) the vessel may either form one of a fleet engaged in a general action, or on blockading service.

In considering the best method of defense for a ship at anchor, much, of course, will depend on the nature of the harbor, the means at her disposal for this purpose, and the facilities possessed by the enemy for making an attack with torpedo-boats; but there are certain broad principles on which all systems of defense devised with this object should be based.

First, that the approach of the torpedo-boats must be signaled (automatically, if possible) to the ship at a considerable distance from that point where their Whiteheads would be discharged (this torpedo-firing point may be taken as some four hundred yards from the ship); the object being to keep the torpedo-boats under the fire of the guns of the defense as great a time as possible, before they have reached their proper distance from the ship from where they could fire their Whiteheads with a fair probability of striking the ship.

Second, that the guns of the defense must be worked on a system which will insure to them their maximum effectiveness.

Third, that the ship must be provided with means to prevent a successfully fired Whitehead from exploding in contact with her bottom.

Fourth, that electric search-lights must not be used until the approach of the torpedo-boats has been signaled.

Fifth, that in choosing a suitable anchorage, and in mooring a ship, every advantage must be taken of the formation of the harbor to reduce to a minimum the number of points from which the torpedo-boats can deliver their attack.

These defensive principles, which admit each of a vast amount of discussion, will be dealt with separately in as detailed a manner as is consistent with a paper of this nature, but it is by no means to be considered as conclusive.

The immense importance of providing our costly fleet-ships, and also smaller war-vessels, with some external means of preventing the explosion of a Whitehead in actual contact with the ship's bottom, must be self-evident to all who have studied the art of torpedo warfare, and is so imperative a necessity that it is simply incredible that no really practical solution of this (surely not very complex) mechanical problem has yet been demonstrated.

External protection is the only practical form of ship-defense against the Whitehead, for the reason that, however secure from actual sinking a ship may be constructed by means of innumerable water-tight cells, double or treble bottoms, armored decks, and such-like devices, yet the explosion of a small charge of gun-cotton such as these Whiteheads carry (ranging from thirty pounds to ninety pounds) in actual contact will most surely at least rupture the outer skin, and probably next inner skin, and thus more or less disable her, while the ship will at the same time experience a serious and dangerous shock.

While allowing that this constructive form of protection is the best solution of this problem, the question as to whether it can be applied to existing ships seems answerable only in the negative; and here it is only intended to deal with torpedo-boats, Whiteheads, ships, guns, etc., as at present in existence, or in course of construction.

Every vessel of war nowadays, more particularly the fleet-ship, is neither more nor less than an expensive box containing a mass of intricate machinery of one kind and another; and thus the shock caused by the explosion of a small charge in actual contact with this box will most assuredly be attended with evil effects, and be the *more* dangerous part of the whole explosive effect.

From General Abbott's report upon experiments and investigations to develop a system of submarine mining for defending the harbors of the United States, the following information is obtained.

That an instantaneous pressure of 6500 pounds per square inch may be adopted as the measure of a fatal shock to a first-class ship of war; that a charge of 90 pounds of gun-cotton will give an intensity of action of 19,000 pounds per square inch if exploded at a distance of 6.1 feet from the side of a ship, and 75 pounds and 33 pounds of gun-cotton will give an *equal* intensity of action at 5.5 feet and 3.8 feet respectively.

Thus all the efforts directed towards devising a method of protection for our ships should be concentrated wholly and solely on an arrangement which, consistent with the other necessary requirements, will force the present locomotive or auto-mobile torpedo (Whitehead) to explode at a respectful distance from her side,—*i.e.*, without the dangerous range of the largest charge carried by these torpedoes.

It has been satisfactorily demonstrated that a properly constructed net hung from the vessel's side will most effectually arrest the progress of a Whitehead, and if it be caused to explode in the net comparatively little damage results thereto.

For instance, at the experiments on the "Oberon" at Portsmouth, May 25, 1876, a charge of sixty pounds of gun-cotton dry (wet, seventy-five pounds), contained in an iron case one-quarter inch thick with cast-iron ends, was exploded at an actual distance of fifteen feet from the side of the target at a depth below the surface of ten feet. The charge represented that of the nineteen-foot Whitehead, and its position corresponded to that of this torpedo when striking a net. The effect of the explosion upon the ship was *inappreciable.*

The results of experiments made against steel-wire nets prove that the thirty-three-pound gun-cotton charge (which is the charge of the greater number of Whiteheads in use) has little or no effect on the net itself, and none whatever on the ship. The larger charge, seventy-five pounds, of the latest Woolwich pattern of Whitehead, and the ninety pounds charge of the large Fortification Whitehead, would most probably seriously damage the net defense if exploded in it, but at the distance of fifteen feet from the ship, at which the explosion would thus take place, would not sink or permanently injure the vessel, though doubtless she would receive a severe concussion, especially from the heavier range. General Abbott gives as the extreme dangerous range of ninety pounds of gun-cotton twelve and one-half feet, of seventy-five pounds eleven and two-thirds feet, and of thirty-three pounds seven and three-fourths feet; so that a net should be placed at a distance not less than twenty feet from the ship's side, but if it cannot be fixed rigidly then this distance must be extended to thirty feet, or as far as practice proves necessary, so as to prevent the momentum of the Whitehead, on striking, from driving the net in towards the vessel, and thus allow a possibility of the explosion of the charge taking place within its actual dangerous range.

As this matter stands at present there seems to be too great a tendency in our navy to under-rate the usefulness and importance of the net defense, and to trust to extemporized means for rigging out the net, instead of resorting to every means possible to secure to the service a net protection possessing all or most of the features demanded by naval officers as absolutely requisite for a perfect system of ship-defense of this nature. The paramount necessity of obtaining some means of keeping the Whiteheads off a ship, or, in other words, of reducing to a minimum the actual effect on the ship of a Whitehead explosion, calls for an exceptional effort, and this at once.

It would be necessary for the navy to come first to some definite decision as to what this problem consists of, and what it really wants, and then, if a prize adequate to the occasion be offered for a practical realization of their requirements, there should be no difficulty in obtaining for our ships of war a net, or other form of external protection, that shall render them almost if not absolutely invulnerable to the Whitehead attack when lying at anchor, and possibly under ordinary conditions of weather at sea also.

To save a useless waste of time and energy to those who study this problem, it would be well to collect all information as to what has been already effected in this direction, to be submitted confidentially to intending competitors. Doubtless some device other than a net, as a metal shield, etc., may be invented, but the net of proper construction, by reason of its elasticity, pliability, and open meshes, seems to be the most suitable means. It is often said that a net could be sufficiently broken by the explosion of one Whitehead in it, to allow of the passage through to the ship of another one immediately following in the wake of the first torpedo; but this idea is purely theoretical, and can never be practically realized with torpedoes such as the Whitehead, incapable of being controlled either in regard to its speed or its direction; such a consummation is feasible with a controllable torpedo, which, in addition to being under perfect control during the whole of its run, carries, as a rule, a very heavy charge of explosive.

The net form of defense is also objected to because it in some measure militates against the general efficiency of a ship when used under way, by limiting her speed and decreasing her manœuvring powers, while in a sea way some trouble is experienced in keeping the bottom of the net at the proper depth; but these objections do not hold good in the case of a ship at anchor, which is more particularly the condition under which a ship would require a net defense; neither ought these difficulties to be insurmountable.

(A) *The attack and defense of a ship at anchor in a home or other port.*

On the outbreak of war there would of necessity be found in our naval ports at home a number of our men-of-war awaiting instructions, and others preparing for sea, which vessels would offer a tempting opportunity to an enemy close at hand, and possessing a number of torpedo-boats, to attack the instant war be declared, or possibly even before, if it appear impossible to avert the threatening war, and thus endeavor at the very outset to strike a serious blow on our naval superiority.

In the same manner, the same opportunity would be offered to us; but, unfortunately, our navy is not in a position to take proper advantage of any such chance, owing to the inferiority in numbers and quality of our torpedo-boats; yet it is certain that an attempt of this nature would be made, even with the few inferior boats we now possess, if our naval torpedoists be permitted to do so. It is hardly necessary to point out what a scandalous shame it is that our navy in this respect should be so puerilely impotent.

Thus, due to the liability of our ships lying in our naval ports being attacked by an enemy's torpedo-boat fleet on the immediate declaration of war, it behoves our naval authorities to instantly set about devising and preparing a complete system of defense, which shall enable our ships lying at anchor in a harbor to protect themselves more or less effectually against the attack of the insidious torpedo-boat armed with the Whitehead, whose blow is so fatal if allowed to come home.

Such a scheme should include a system of defense capable of forming an integral part of the ship's equipment, and a more elaborate and complete arrangement to be adapted to the peculiar nature of each of our principal harbors, and which should be stored there in readiness for instant use, so that in the event of one of our vessels of war taking refuge in any one of them, she may find ready to hand a system of defense by which to supplement the equipment supplied to her for this same purpose.

At the present time our ships have to depend almost entirely on their Nordenfelt 1-inch guns for their safeguard against an enemy's torpedo-boats; in the case of our larger ships these are supplemented by one or more electric search-lights, and here and there by a net equipment: the latter means being partly extemporary and only made use of in a half-hearted manner; in fact, there is a tendency on the part of many officers to look upon this form of protection as an abominable nuisance, and as one of the many Vernon fads,—a view that cannot be too severely condemned, and which common sense should never permit to exist, for it may well happen that on the efficiency of her net defense may possibly depend the very existence of the ship and the lives of many of her crew.

Now, it has never been supposed that a ship can or ought to rely on her anti-torpedo-boat machine-guns alone, whether the Nordenfelt 1-inch, or other kind, for the purpose of repelling torpedo-boat attacks, even by the most hot-headed machine-gun enthusiast; but surely it cannot be denied that a ship provided with an adequate armament of these 1-inch guns will be infinitely better able to cope with the torpedo-boat than a vessel in which this weapon is conspicuous by its absence, allowing the other means of defense to be the same for each.

The Nordenfelt 1-inch volley-guns in our navy, and the Hotchkiss 1½-inch revolving gun in the French navy, ought properly only to be treated as an important function of a complete system of ship torpedo defense; but as in both the French and our navy no complete scheme for this purpose can be said to have been yet matured, we and the French are seemingly quite satisfied to intrust the protection of our ships to these very machine-guns, and to them alone.

Whatever kind of passive obstruction to the advance of the torpedo-boat be resorted to, it is but for the purpose of delaying them under the fire of the ship machine-guns; and unless these obstacles be well guarded by machine-gun fire, it is but putting off the evil moment, as such obstructions can be readily cut adrift or destroyed by the torpedo-boats. Even with explosive floating booms,—*i.e.*, iron or steel tubes filled with a charge of explosive and arranged to be fired by the contact of a body, as a torpedo-boat,—this active obstacle at the worst would destroy the leading boat, and then leave a clear passage for those following in her wake; while if obstacles of this nature be expected to be met with, it would not require any great ingenuity or elaborate scheme to render them innocuous to the torpedo-boats, and here the actual protective value of the explosive boom to the ship depends upon the effectiveness of the gun-fire she can direct on to the torpedo-boats when necessarily delayed in their advance by this or any other kind of obstacle.

The method of using the electric search-lights and the machine-guns in the defense of our ships, as at present practiced, does not appear to insure to the guns their maximum of effect, but rather aims at destroying the principal and most important characteristic of our Nordenfelt 1-inch guns,—viz., its rapid volley-fire; while the electric light is used apparently on behalf of the torpedo-boat, for the beam of light is kept playing on the approaches to the harbor, thus affording to the torpedo-boats a light to guide them to the entrance and a means of discovering in what part of the harbor the ship lies; it is just as important, if not more so, for the ship, and harbor's mouth to be concealed from the view of the attacking torpedo-boats, as for the latter to make their advance unobserved by the ship.

In actual war on an ordinarily dark night it will be found of more or less difficulty, acording to the nature of the cost and harbor entrance, for the torpedo-boats to pick up the passage, who will have had to make the coast after nightfall. Strong currents, tides, wind, and sea, also hazy, foggy, or very dark nights, will, of course, still further add to the difficulty, for there will be no kindly coast or harbor lights to guide them, and the pall of utter darkness will be spread over the shore and shipping, as in war not a light showing to seaward will be permitted in the houses on shore, nor in the ships, while as far as is possible absolute silence will be enforced; in addition there has also to be remembered that the torpedo-boat commanders may be practically unfamiliar with the approaches to the particular harbor to be entered, and, however perfectly acquainted with it by chart knowledge, this will avail but little at night. The Russian torpedo-boat commanders will, from their experience of 1877–78, most assuredly confirm this view.

Then, in preparing a scheme for the defense of a ship anchored in a harbor, the first article will be that every means must be resorted to for the purpose of concealing the harbor and entrance as well as ship from the enemy; no light of any sort that might afford a guide to the torpedo-boats to be allowed, absolute silence to be insisted on, the lower yards and topmasts of all ships, when practicable, to be struck, and the electric search-lights on no account to be used until the right moment has arrived.

The second article will be to surround each ship with a properly prepared net (thirty feet from her side and fifteen feet deep), or, better still, a double net, an inner and outer one with fifteen feet between them.

The third article will be to devise an arrangement whereby the approach of the enemy's torpedo-boats can be automatically signaled to the ship from a considerable distance, say one thousand yards as a minimum.

Such an arrangement might consist of a series of buoys (fitted with a blue light, or a Holmes signal-light) anchored by round shot or other simple mooring, and coupled together by a small grass or wire rope, in such a manner that on the bow of a torpedo-boat coming into contact with the line it shall set alight the buoy or buoys nearest to where this contact is made. This scheme is merely put forward in the rough here, but there should be no difficulty experienced in rounding off its sharp angles and rough edges, so that a satisfactory and practical arrangement remain; simplicity, lightness, and compactness, together with the greatest degree of facility and rapidity in laying a signal-line of this nature, should be the main points aimed at.

In some cases it may be necessary to completely surround a ship with a cordon of these signal-buoys, so as to prevent any possibility of the enemy's torpedo-boats creeping along the shores of the harbor, and making their attack on the ship unexpectedly from behind, and so completely disconcert the defense, anticipating an attack from the direction of the entrance. In a special case of this sort the length of rope or wire required for forming a signal-cordon at, say, a range of two thousand yards from the ship as a centre, would be about twelve miles, and some eighty buoys would be required, the number depending on the distance at which they are to be placed apart, which only practical experiment can decide. The connecting wire would only need to be very thin, one mile of which could be reeled up on a comparatively small reel, while its weight would not be very great. An extempore arrangement such as described has, it is said, been tried in the navy with great success. This cordon system would have the advantage over explosive booms of being very much simpler, less costly, and would not lock the ship herself in.

In considering the advance, or outer obstructive or signal-buoy defense of a ship, it must be understood that on no account must a gap here and there be left, which might by good fortune be discovered by the enemy's boats. A scheme of this kind is indispensable; and where possible, would be, of course, strengthened if used in conjunction with booms, explosive or not, moored inside the signal-line, and in conjunction with guard-boats should insure to the ship, if properly equipped with machine-guns, complete immunity from a torpedo-boat attack where the Whitehead is the weapon of offense; further, a double or treble cordon will still more enhance its value as a protection.

An equipment of signal-buoys and lines should be provided for each ship, as part of her own stores, and also a more elaborate equipment for each of our principal harbors. It may be argued that it would be an easy matter to arrange for the cutting of the coupling-line; but in effecting this work a sufficient pull or jerk would be given to set the signal-buoy alight, and, in entering a harbor, the torpedo-boats would necessarily be obliged to proceed very cautiously, in fact feel their way at a very slow speed, and in the cutting of the line after the light has been made to blaze forth, no harm would be done.

The fourth article will deal with the active means of defense provided by the ship herself, such as guns, electric search-lights, and guard-boats; the latter may preferably be specially designed vessels attached to each harbor. The use of guard-boats, except in conjunction with signal-cordons, would not be capable of affording any absolute security to the ship; but a few special harbor guard-boats, or torpedo-boat hunters, used to patrol the harbor's mouth or at a considerable distance outside the outer signal-line, would prove of immense value to the defense, first by disconcerting the formation of the enemy's fleet of torpedo-boats long ere they have reached even the signal-line, much less their torpedo-firing range; secondly, by the possibility of capturing or disabling one or more of them; and, lastly, by signaling their coming, so that the ship's crew would be all prepared to meet them with a heavy fire of machine and other guns when those who have succeeded in escaping the guard-boats reach the signal-line.

In carrying out this patrol duty the guard-boats must on no account chase the enemy's torpedo-boats into the harbor, but leave the ship to deal with those that have succeeded in safely passing by them, or otherwise there will be a considerable risk of the guard-boats being themselves destroyed by the fire of their own ships.

For this special purpose (harbor patrolling) there does not seem to be any adequate reason for constructing these hunters of much greater dimensions than the ordinary sea-going torpedo-boat: one hundred and thirty feet long, and fourteen feet beam, with a full speed of twenty knots, would satisfy all the requirements of such a craft. Their special features should be high speed and great manœuvring powers. They would not require to carry a large coal-supply, as they would never be employed far from their base (harbor). They would require to have a fairly steady gun-platform; an armament of say two Nordenfelt 4-barrel 1-inch guns, and two quick-firing shell-guns, would be ample, for on this service the range would, especially in night attacks, be usually very short. They might also be armed with a couple of Whiteheads in bow tubes, to enable them to be used against an enemy threatening the port, or attempting to establish a blockade. Their speed of twenty knots ought to be easily maintained, for, as before stated, they need not carry more than a few tons of coal; but, of course, the proper design for this class of vessel is a matter that rests entirely with our naval authorities.

Commander Gallway, R.N., in his recent lecture advocated very strongly the construction of very much larger vessels as hunters than those proposed here; but then there is a very material difference between the requirements of hunters that are to accompany fleets to sea, and those that, as in this case, are intended solely for harbor defense. The former will be dealt with in the proper section.

A ship at anchor should further be moored head and stern to present, if possible, only her bow to the attack; and when the nature of the harbor admits, she should be moored in this manner close to the shore, with the object of circumscribing as much as possible the area of attack, in fact oblige a direct end-on attack to be delivered. The advantage of such a mode of action was amply proved during the Russo-Turkish war (1877), at the time of the second attack by Russian torpedo-boats on the Ottoman fleet at Batoum, where Hobart Pasha had moored the Turkish ships head and stern, bows pointed to the entrance, and sterns almost touching the shore, and in some measure the failure of the Russians to hit either of the ships with their Whiteheads (how many were fired they alone know) may be attributed to this mode of anchoring the Ottoman fleet.

A Whitehead on striking a ship at a small angle to the keel line will very likely not be exploded, but, instead, shoot off in a new direction; and to provide the bluff nose of the new Whiteheads with a means whereby their explosion would be rendered certain at any angle of striking, would probably seriously interfere with their accuracy, or render them dangerously sensitive.

The sight that Commander Gallway, R.N., mentioned in his lecture to have seen while conducting a sham torpedo-boat attack, of a fleet of ships swung head and stern in one long continuous line with their broadsides exposed to a direct attack from the harbor's mouth, ought never to be possible in a time of war in any civilized navy. The electric search-lights (three for each first-class ship) would be fixed in the position that experiment has shown to be the most suitable, and, attended by one or more men, should be ready for instant use, but not to be used until the first signal-buoy is lighted, and then the beams of one or more should be thrown in that direction, when it could not fail to expose at once the advancing torpedo-boats.

The heavy guns of the ship should be loaded with shrapnel, fused for, say one thousand yards (the outer signal-cordon being at a distance of two thousand yards) and elevated for that, or whatever range may be considered the most effective. The quick-firing 6-pounders with common shell, and together with the 1-inch and rifle-calibre machine-guns also ready for action, should be elevated for one thousand eight hundred yards. Then the method to be adopted in firing these various weapons might be somewhat as follows: the 1-inch and rifle-calibre guns will open fire on the order "Commence" accompanied by the direction "Starboard" or "Port guns," "on the bow," beam, or quarter, according to the position of the blazing signal-buoy or buoys lighted up by the beam of the electric search-light, one man working the firing lever as fast as possible, one slowly altering the elevation by the elevation wheel, one working the traversing wheel sharply right and left, thus spreading the volleys, and two or more shifting hoppers; the captain of the gun should merely superintend the whole service of his weapon and endeavor to keep his crew from becoming too excited and flurried. It will be observed that in this system the waste of time consequent on trying to align the sights with the torpedo-boat, a practical impossibility at night and in the face of its rapid movement, is altogether avoided, and the whole effectiveness of these volley-firing machine-guns is retained: it is not the ratio of hits to shots expended that matters, but that the torpedo-boat be hit as often as possible. The 6-pounders should be aimed as accurately as the circumstances will permit; but here again the so-called waste of ammunition is immaterial, for if only one 6-pounder shell strikes a torpedo-boat, it will probably be a sufficient dose. But the heavy guns must be carefully laid, as in their case only one shot from each will be fired, and that one should be made as effective as possible.

In the case of a ship that can choose an anchorage such that only one side, or her bow, is open to the attack, then it should be possible to shift the machine-guns from the unexposed, and concentrate them on the exposed sides. It must be understood that these are merely suggestions as to the construction of a complete scheme of ship defense against the torpedo-boat attack; but though actually theoretical, they are based on practical experience and may claim to be practically reliable. To recapitulate the main features of this scheme: first, there is the systematic manipulation of the electric search-lights and the gun armament, so that each shall be allowed to play its own part to the very best of its ability; secondly, the ship is to be anchored most advantageously to reduce the points of attack to a minimum, and to decrease the size of the target which the Whiteheads will endeavor to strike; thirdly, the guarding of the ship with one or two carefully devised nets; fourthly, the provision of an automatic means for signaling the position of the advancing torpedo-boats at a distance within the range of the machine-guns, and which shall afford to them time to deliver a heavy fire; lastly, the employment of special guard-boats to capture or disable the torpedo-boats, and herald their approach in time to prepare the ship to accord the enemy a warm reception.

The value of a system of defense of this nature will depend as much on the skill of the operators,—*i.e.*, the officers commanding the guard-boats, the battery officers, captains of guns, and the electric light manipulators, and the care and attention with which they have been instructed in this most important branch of their service—as on the preparation of the details of the plan, and the selection and construction of the various material.

There is another point which seems to demand some consideration, which is that the number of anti-torpedo-boat machine-guns at present provided for each class of ship, particularly in the case of those of the first class, is inadequate to the vastness of the interests they are called upon to protect. If the French consider that it is necessary to arm their fleet-ships with twenty-two of these Hotchkiss guns, what are the reasons that have dictated the provision of only ten of these Nordenfelt guns for our fleet-ships? It may be that the superior hitting powers of the Nordenfelt, as proved by our Portsmouth trials, which enables ten of the latter to equal about twenty-two of the former in this respect, has led to this decision; but surely, if the French fleet-ships can mount twenty-two Hotchkiss guns, similar vessels in our navy can be equipped with more than ten Nordenfelts, and if so, why not take full advantage of the superior qualities of our anti-torpedo-boat gun (adopted and chosen by our naval officers), and give to our fleet-ships all the 1-inch Nordenfelts they can conveniently mount? This class of vessel will soon have a number of the new 6-pounder guns in addition to their 1-inch guns, but even then room will be left for mounting more of the latter, and every additional anti-torpedo-boat gun means another chance of frustrating a torpedo-boat attack; more especially when the ship is attacked at sea by a number of torpedo-boats, for in that case she will have to rely for her safety almost entirely on the number of these weapons she carries.

A fleet-ship of the present day represents a money value of about a million of pounds, and surely so costly an article is worthy of being accorded an adequate protection, if only from a financial point of view, while in addition thereto the lives of some six hundred or eight hundred men are at stake, and, further, the still more important fact that the loss of even one such a vessel would be an irreparable and most serious blow to our naval strength in a time of war. The value of the offensive torpedo for the destruction of our enemy's ships is very great, but is not so vastly important to us as the protection of our ships from the torpedoes of the enemy.

There appears no reason why a number of 1-inch guns should not be carried over and above the actual number that can be conveniently mounted in our fleet-ships, and stowed below, when there is no likelihood of a torpedo attack being made; neither can there be any feasible objection to fitting specially prepared platforms from bulwark to bulwark, abaft, amidships, or ahead, which can be shipped and unshipped as desired, on which to mount these additional guns.

In concluding this section it must be remarked that the energy directed towards defensive measures is in our navy neither strong enough nor well directed; and it is difficult to understand how it is that the country can complacently view the construction of these huge, costly fleet-ships, which the well-directed blow of a single locomotive torpedo will suffice to destroy, but for whose absolute safety no adequate system of defense has yet been matured or attempted.

(B) *The attack by torpedo-boats of a ship at anchor.*

This matter would require the whole of this paper devoted to it to enable all the pros and cons of each different feature to be discussed, and thus it will be only possible to touch upon some of the more important points connected with this section.

It would appear as if but the mere outlines of a scheme of attack can be laid down for general use, the form of the body to be filled in depending on the nature of the harbor to be entered, the knowledge possessed as to the probable system of defense likely to be adopted by the enemy, the class and number of torpedo-boats forming the attacking force, the state of the weather, and other matters which will or should be known to the officer (torpedoist) in chief command, if not from former experience, at least as the result of constant practice in peace time under conditions assimilated as far as practicable to what is likely to be experienced in war.

It may be pointed out here that this point would in some measure be gained by making a sham attack on a ship anchored in some port not quite so practically familiar to the torpedo-boat commander as is Portsmouth, Portland, Berehaven, and other places which are usually chosen for this purpose; and there must be plenty of ports on our coasts not only unfamiliar, but also where no harbor lights are used, but which, of course, are clearly marked on the charts. It must be borne in mind that the attack cannot always choose the harbor in which their hoped-for victim shall anchor, any more than they can choose the mode of the enemy's defense or settle what the weather is to be at the time of the attack.

There is one point deserving of the most careful training on the part of all officers, particularly those likely to be employed on torpedo-boat service, and that is the faculty of correctly estimating distances at night between a torpedo-boat and a ship (from the boat) and between the ship to a torpedo-boat (from the ship); the want of this capability may mar what otherwise might have been a successful affair. As in this case more than one torpedo-boat will always be employed (a maximum of eight, and minimum of four), it is absolutely indispensable to success that unanimity of action between the different commanders shall exist in a high degree, and implicit confidence in their leader by the juniors, and in his juniors by the leader, and it is only by continued practice that these conditions will be obtained. Further, each torpedo-boat commander must fully comprehend that an operation of this nature partakes more or less of the nature of a forlorn hope, at least in so far as the boats are concerned, and that the destruction of his charge is as nothing to the ultimate success of the undertaking.

It has been found, in practice, that the electric search-light beam directed on an attacking torpedo-boat is most disconcerting, and is liable to cause a serious error in judging the distance of the ship and in directing the aiming of the Whitehead; but this trouble might possibly be in some degree overcome by practicing advancing in this way and dropping buoys when the proper distance for the discharge of the torpedo is supposed to be reached.

Subject to all the foregoing considerations the actual success of a torpedo-boat attack will be in the inverse ratio to the strength, efficiency, and preparedness of the measures taken for the protection of the ship attacked. The more this subject is considered, the more it appears necessary to form a special torpedo-boat corps.

Before leaving this subject,—viz., the defense and attack of ships at anchor,—it is necessary to point out that only the Whitehead torpedo has been treated of, for the reason that this weapon is the principal arm of our navy; and the object was to deal, as far as possible, only with things actually in existence and in general use in our service.

It may be that some day an unsinkable and indestructible (by small torpedoes) ship-of-war will be designed; but we have none, and we cannot, certainly, reconstruct the ships now afloat. So, with the torpedoes, the day is certainly not far distant when some satisfactory application of a perfectly controllable locomotive torpedo will be obtained, which will render the defense an even more difficult matter, and the attack of ships far more serious, than is the case now.

(C) *The use of the torpedo-boat in a fleet action.*

Firmly convinced that this is not a proper function of the torpedo-boat, owing to that objectionable characteristic of the Whitehead and all such torpedoes, viz., its absolute uncontrollability after it is fired, and as no experience of any sort is to hand in regard to this question, it will be needless to do more than note some of the principal points for future discussion, in the hope that by such means some elucidation of this seemingly very mysterious tactical problem may result.

First comes the question as to the class of torpedo-boats that it is intended should accompany a fleet to sea; will they be independent sea-going 120-foot boats, one or two attached to each fleet-ship, in addition to her two second-class torpedo-boats, or will only these latter be used? which boats, except in fine weather and smooth water, will be practically of little use. Then, supposing each ship on both sides to be accompanied by two of these 120-foot boats, for instance (we have only four of these larger ones under construction, but none in the service), is the engagement between the fleets to open with a grand attack of the torpedo-boats, and, if so, will not this be resolved into a general *mêlée* in the open but gradually decreasing space between the rapidly approaching ships of both sides, and would not this possibility render such a mode of action most dangerous and impracticable in actual war? One side may direct its torpedo-boats to make straight for the enemy without engaging those of the enemy, but it cannot enforce this mode of proceeding being followed by their opponents.

It is after the first grand charge of the contending fleets has been completed, when all formation will be necessarily broken up, and several ships of both sides probably sinking or disabled, that the torpedo-boat may be brought into play, either in protecting one of her own ships, or by attempting to give the final death-blow to a hostile ship; but even then the greatest care will have to be exercised by the torpedo-boat commanders in firing their Whiteheads, that, in the smoke and confusion, the blow intended for an enemy be not received by a friend. There is also a very possible risk that a Whitehead which has missed its mark may not sink as it ought to, but rise and float on the surface, thus becoming a serious danger to friend as well as foe. On the other hand, there is the probability of a torpedo-boat being mistaken by a friendly ship for one of the enemy's boats, and consequently fired into with more or less serious effect by her friend; for if, on emerging from, or in the smoke, a ship suddenly discovers a torpedo-boat approaching or near her, to wait until the question of friend or foe was settled might end in the ship herself being settled.

As to the torpedo-boat catchers, or hunters, of from three hundred to four hundred tons, it appears also difficult to understand what part they are intended to play in a general naval action, and it is to be hoped that some more definite information of a practical nature will be forthcoming before we expend large sums of money on the construction of vessels which are too large for use as torpedo-boats, and too small for sea-going cruisers, while their speed (eighteen knots) is not sufficiently high to enable them to catch, though of course they may hunt, the large torpedo-boats. Surely it is not necessary for each ship to be accompanied by a 300-ton vessel to protect her from the attack of a 13-ton (second-class ship) torpedo-boat; much better to provide her with one or two specially designed small hunters armed with machine-guns, on the principle of "set a thief to catch a thief."

The nine large torpedo-vessels now building by the French are seemingly something more than mere torpedo-boat hunters, rather should they be called "commerce destroyers;" for their size, armament, and the special attention paid to the protection of their machinery and vital parts points to a more extended sphere of action for them. In fact, they might fairly be looked upon in the light of a direct menace to our commerce in the Channel and the Mediterranean; a view that is further strengthened by the fact that the French are infinitely superior to us now in the matter of torpedo-boats, both in point of numbers and quality (and, judging from the apathetic indifference of the country as to the condition of our navy, likely to remain so). It is not the French, but we, who ought to be building torpedo-boat hunters, though, with this purpose in view, not of such large dimensions as the French so-called hunters, or so unnecessarily powerfully armed, and that work should be proceeded with as rapidly as possible.

All the European naval powers have each great numbers of torpedo-boats, while we, who claim to be the principal naval power of the world, have many torpedo-boats (including second-class ones) certainly, but the less said about their quality, in comparison with the French, German, Italian, and Austrian flotillas the better; and, worse than all, we have not a single hunter (small or large) built, building, or apparently about to be built.

Our future torpedo-boat is, according to a drawing exhibited at Commander Gallway's lecture, to be one hundred and twenty-five feet long, with twelve and a half feet beam, speed somewhat less than nineteen knots, but armed with five torpedo-guns instead of the usual double-bow gun; now, as our present naval authorities declare that we only require a few of these sea-going torpedo-boats, because they opine (not vainly, let us trust) that our navy would always be able to act on the offensive, then most decidedly there is all the more reason why those few should be superior (if feasible) or at least equal to any built or building in *England herself* for foreign navies. Surely this is not demanding too much from our naval administrators; and yet at Messrs. Yarrow's boat-yard on the Thames there are under construction two torpedo-boats for the Austrian government having a length of one hundred and thirty-five feet, with a beam of thirteen and three-quarters feet, and which are to have a speed of *twenty-four* knots per hour when light, and *twenty-two* knots when *fully equipped ready for action*, so that our projected torpedo-boat of the future will be much inferior in respect to speed, protection, sea-going qualities, coal supply, and accommodation to what is being now achieved by an English torpedo-boat builder for a foreign navy.

(D) *The torpedo-boat* vs. *a single ship at sea.*

In clear weather, in the daytime, a ship with fair speed and handiness should be able to manœuvre so as to make it exceedingly difficult for a *single* torpedo-boat to effect a success. The principal object of the captain of the ship would be, of course, to prevent the torpedo-boat from obtaining a position on his beam at a range close enough to allow a Whitehead to be fired with some certainty of hitting. But the best mode of proceeding under these circumstances could be easily determined by practical experiments at sea, and would certainly not be for the ship to steam towards the torpedo-boat in such a manner as to reduce the time of the latter being under fire of the guns of the former to a minimum, or to enable the boat to pass at the proper distance of three hundred yards from the ship without any change being made in the course of either.

In the case of a ship under way off an enemy's coast being attacked by, say, four torpedo-boats which have succeeded in getting to seaward of her, the chances of her escaping would be but small, and her best defense, if adequately armed with a number of anti-torpedo-boat machine-guns and quick-firing shell-guns, would seem to be to protect herself with her net, and trust to her machine-guns to repel the attack. In all cases, however, of a ship at sea attacked by torpedo-boats, her escape would depend as much, if not more, on the power of her machine-guns than on her speed and handiness.

In conclusion, it is necessary to impress on our naval authorities that the whole question of torpedo-boat attack and defense, as applied to our navy, demands the most careful and immediate attention. It is a matter with which every executive officer, be he sailor, gunner, or torpedoist, is, or ought to be, equally interested; and there ought to be perfect cohesion between them in all matters appertaining to the honor and glory of England's navy, of which none is of more vital import than the subject of this paper.

GENERAL LEBRUN AND THE TWELFTH FRENCH CORPS AT SEDAN.

(Translated from the *Jahrbücher für die Deutsche Armee und Marine* by STANISLAUS REMAK, late First Lieutenant Fifth U. S. Artillery.)

THE literature upon the battle of Sedan has recently been increased by a work, which has not failed to receive the greatest consideration in France, and to give anew an impulse to historical research upon the subject of the causes of the catastrophe. While former publications had, with few exceptions, taken sides either in behalf of the view of Ducrot as to a possible retreat upon Mézières, or in behalf of the idea of Wimpffen that the beleaguered should have endeavored to cut through the ranks of the assailants in the direction of Carignan, the author of the work before us "BAZEILLES–SEDAN, par le GÉNÉRAL LEBRUN,"[1] belongs to those neutral writers, who take no decided part with regard to either of these controverted theories, and who appear to be principally concerned in placing their own participation in these events in the clearest possible light. Yet we must ascribe to this book an especial value above others of the same nature, on account of the oft-recurring, really bluff, frankness with which the author speaks of the internal condition of affairs in the "army of Châlons," and of the transactions which preceded the capitulation.

Shortly after his release as a prisoner of war, the General wrote a work entitled "Mes Souvenirs," which is said to contain important revelations upon the military and diplomatic history preceding the war. Out of consideration for still living individuals of high position, (probably the Empress Eugénie), the publication of this work was deferred, and the author, "yielding to the prayers of his friends," has endeavored to recount at least the participation of the Twelfth *corps d'armée* in the events preceding and during the battle of Sedan. He acknowledges further that he has been principally impelled no longer to delay giving his comments to the world, in view of the recent appearance of two books, each under the title "Bataille de Sedan." One of these books, by Halévy, is a somewhat inferior piece of work, containing the notes of a civilian surgeon employed in the vicinity during the progress of the battle; the other, according to the opinion of Lebrun, is by a French officer, who in the text designates himself as a Marquis. Here the author encounters the fatal misfortune of regarding in down-right earnest the French translation of the book "dies irae," well-known to German readers, not appreciating that this presents a fantastic picture after the manner of the famous "battle of Dorking," and that it has come from the pen of the German writer Carl Bleibtreu.[2] Lebrun, who in this work,—which must be admitted to be of rather questionable value,—is pretty badly treated, designates the same in lively disdain as an "œuvre de fantaisie et de mauvais goût," and comes to the conclusion that its author must have been one of those improvised officers of the later war period, but in no event an officer of *high rank.*

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[1] Bazeilles–Sedan, par le Général Lebrun. Avec 2 cartes. Paris, E. Dentu.

Disregarding what is well known, we shall extract only from the descriptions, given in plain, natural language, without attempt at ornamentation, that which may prove new and interesting to our German readers.

In the council of war, which was held on the 17th August in the camp at Châlons, under the presidency of the Emperor, General Lebrun received the command of the newly-formed Twelfth corps in the place of Trochu, who had been appointed Governor of Paris. It had been resolved in this council of war to send the rebellious *gardes mobiles* back to Paris, and the necessity had been urged upon the Emperor of leading the army of Châlons back under the walls of the capital. The strength of the Twelfth corps is calculated by Lebrun as consisting of three infantry divisions and one of cavalry, comprehending an aggregate on the 18th August of 30,000 men; but from the 20th, after the junction of some troops of the Sixth corps, which were assigned to the Twelfth, its strength was increased to 45½ battalions, (including 2 companies of rifles), 24 squadrons, 28 batteries, and 5 companies of engineers, aggregating in all 41,000 men. The statements in the work of the Prussian general staff (vol. 2, No. 32) do not fully coïncide with those of Lebrun, especially with regard to the command and distribution of the brigades. The second division (Lacretelle) is given in the work of the general staff as consisting of 2 brigades (Bernier-Maligny and Marquisan), Lebrun naming 3, viz.: Morand, Marquisan, and Luvent; in the above work, the brigade Morand (first and second marching regiments and 2 companies of the seventeenth and twentieth rifle battalions) is wanting, while, on the other hand, the first division (Grandchamp), first brigade (Cambriels), according to Lebrun, has *no* marching rifle battalion assigned to it, as stated in that work. The horse battery, incorporated in the cavalry division according to the work of the general staff, is unmentioned by Lebrun. In the third division (Vassoigne), General Martin des Pallières is named as commander of the first, Reboul as commander of the second brigade; in the work of the general staff, *vice versa;* the entire strength of the Twelfth corps being moreover there calculated, at variance with Lebrun, as consisting of 39 infantry battalions, 1 rifle battalion, 24 squadrons, 28 batteries, and 5 companies of engineers.—The first and third divisions of his corps are designated by Lebrun as *good troops;* not so the marching regiments of the first and second brigades of the division Lacretelle, formed out of 12 fourth battalions; as reliable, he refers only to the regiments of the third brigade (Luvent), the fourteenth, twentieth, and thirty-first regiments of the line. The strength of the marching regiments varied between 1200 and 3000 men; the enlisted men mostly belonged to the enrolment of the year 1869, and had, in part, only received the necessary instruction upon the mechanism of the Chassepot rifle, *after* their arrival at the camp of Châlons; there was a dearth, in these battalions, of officers and non-commissioned officers, and, indeed, in the corps generally, of staff and departmental officers; and further, there was only *one* ambulance. The Twelfth corps never possessed an artillery park, that at hand belonging to the Sixth corps, from which 6 of the batteries had also been taken. It is characteristic that General Blanchard, who originally commanded the second division, incensed at the miserable condition of the troops of his division, begged another command of the minister of war; on the 19th August, he was, in fact, called to Paris, and superseded by General Lacretelle. Of the Brigadier Generals of the second division, one reported that "upon considerations of health," he was unable to take part in the campaign, while two others, who had been taken from retirement, had to be replaced by more suitable successors.

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[2] By the same author another book has recently appeared: "Who knows?." Reminiscences of a French officer under Napoleon I. By the author of "Dies irae."

Immediately after taking command, Lebrun issued an instruction to his Generals upon the conduct of the troops in action. In this he mentions, as cause of the repeated surprises, the custom of the Germans, not to attack at daybreak but at an advanced hour, when an attack had been no longer expected; he further warns against the flank manœuvres of the German infantry; recommends volley-firing in the place of that of skirmishers, with a view to the prevention of waste of ammunition, and, when opposed to the artillery of the enemy, firing "with great precision," would counsel a frequent change of position.

On the 20th August, the army of Châlons commenced its retreat upon Rheims; the march, 32–35 kilometres, was very severe; no care whatever had been taken in the way of subsistence and the equipage necessary for bivouacs; and requisitions were made, giving occasion to quite disagreeable scenes. It is much to be regretted, says the author, that an "antipatriotic egotism" made itself manifest in the populations of Lorraine and Champagne:—as proof, he relates that the owner of a castle, in which Lebrun had quartered himself with his staff,—a former Parisian merchant,—had made bitterly violent complaints, because some soldiers had taken fire-wood from his premises; that he had called out "he would rather have to do with the Prussians than with French soldiers."—Indicative of the moral condition of the troops, is an item in the instruction of the 22d August, which cautions against the dangers of a panic, and makes it the duty of the battalion commanders "to maintain a calm and energetic demeanor before the front."

It will be remembered that on the 17th August it had been determined in the council of war to lead the army back to Paris; but why, asks Lebrun, did MacMahon march upon Rheims?—Because, continues he, the Generals had unfortunately no longer any voice in deciding the course of the operations, which had to be subjected to political considerations! In the name of the council of regency, the minister of war had, over the head of the Emperor, insisted against the retreat upon Paris, because the return of the unhappy monarch would furnish "*the signal for a rising.*" MacMahon, it is known, took exception to the intimation of the council of regency, communicated to him by Rouher, and had well-nigh succeeded in bringing about better counsels, when there came Bazaine's celebrated dispatch: "Je compte toujours me retirer par les places du Nord." Thereupon, moreover, the immediate march in the direction of Metz was ordered. The character of MacMahon is designated by Lebrun, in connection with this occasion, pointedly, in terse words: "Obéissance d'abord, puis advienne que pourra pour celui qui a obéi."—

Upon the marches which now ensued, the French departmental arrangements again betrayed the most absolute incapacity, so that Lebrun had to depute officers to transact their affairs. In Rethel, where the army remained a day, upon considerations of care and subsistence, the distribution of rations once more became the occasion for great disorder and disturbance. A change in organization was also effected. In consequence of the joining of reserves, the battalions of the Twelfth corps had become increased to a strength of from 12–1500 men each;

twelve new battalions were formed, by taking from 3–400 men from each of these battalions. Of these new battalions, six remained with the Twelfth corps (brigade Marquisan), while six were assigned to the First corps.

On the 29th August the Twelfth corps reached Mouzon, and occupied the positions designated for it on the right bank of the Maas, above the town. What was already at this time the temper of the army and people, appears evident from the following incident, related by Lebrun. The General sent from Mouzon two secret agents (well-recommended, reliable men) in the direction of Montmédy. They did not return. "Probably," says Lebrun, "the reason for this was the strongly prevailing fear of the 'Ulan,' among the inhabitants of the country. The terror depicted upon the countenances of these people, when they saw our army defile, was painfully evident." "What had become of you," cries Lebrun with grief and emotion, "French patriotism of the heroic times of the first republic and empire?"

In the battle of Beaumont (called *combat de Mouzon*), only one infantry brigade and one of cavalry of the Twelfth corps, with a few batteries, took part. Between 11 and 12 o'clock (the work of the Prussian general staff says 12½ o'clock) the first shells came into the bivouac of the Fifth corps.—Upon his own responsibility Lebrun, resolved to send three infantry brigades and one of cavalry to the left bank of the Maas; the Emperor also, in person, called upon Lebrun to relieve the hard-pressed corps of Failly. But only the brigade Villeneuve and the cuirassier brigade Béville passed the bridge of Mouzon; when the *têtes* of the succeeding brigades approached the latter, they were met by a command of MacMahon, to reoccupy the positions on the right bank.—In connection with this method of giving orders, we may here briefly touch upon a highly characteristic incident: When General Failly saw the cavalry of the Twelfth corps *débouching* from Mouzon, he sent an Adjutant with the direction to call upon it to advance as rapidly as possible, so as not to impede his left flank. As the Adjutant (Major Haillot) communicated his message to the commander of the sixth cuirassier regiment, riding at its head, the latter answered in a sharp and impatient tone, "Who are you? I don't know you! I only receive orders from my direct superiors!"—Repulsed in this manner, the Adjutant now betook himself to the commander of the fifth cuirassier regiment, also present, who, without a word of reply, forthwith advanced at a gallop and attacked. "The attack was crowned with success," says Lebrun. In truth it *failed*, under the fire of the 10th company, regiment No. 27, with heavy loss. The remainder of the cuirassiers rode back to the Maas in wild flight, and attempted, in part by swimming, to reach the other bank.

The loss of the troops of the Twelfth corps, which took part in the battle, was very considerable; 6 pieces also remained in the hands of the enemy.

Towards 9 o'clock in the evening, MacMahon ordered the retreat of the beaten army upon Sedan. Lebrun met the Marshal at a bivouac-fire on the heights of Mouzon and was received by the latter with the words: "The day was bad; the corps of General Failly has been pretty roughly used by the enemy; the infantry brigade, which you pushed forward by Mouzon, did not maintain its position with sufficient determination. Never mind! The position is not desperate; *the German army, which we have before us, counts at the most* 60–70,000 *men; if it attack us, so much the better; I hope to throw it into the Maas!*"— —

Towards 9½ o'clock, the corps commenced its retreat, and, after a very arduous march, occupied the positions designated for it at Bazeilles, towards 8½ o'clock on the morning of the 31st August. According to this, the march had continued 11 hours,—to be sure, over partly bad roads and in total darkness;—the distance from Mouzon to Douzy amounts only to 8 kilometres!—

BATTLE OF SEDAN.—The extent of the front of the position of Bazeilles-Daigny, assigned to the Twelfth corps, was 5,000 metres; it is further to be remarked, that the brigade Villeneuve had been erroneously directed by the chief of staff of the Twelfth corps, under the walls of Sedan, and on the eve of battle was attached to the Fifth corps. The contemplated blowing up of the railway bridge at Bazeilles, ordered by Lebrun, had to be abandoned, as it was not possible to provide and transport, in time, the necessary supply of powder, from the fortification.—A detailed account of tactical matters in his corps is not given by the author; he relates his experience, and refers to what was delivered to him in the way of orders, in not always logical or connected sequence, and adds thereto his remarks. With regard to the fact that the French 12-pounders could not, at great distances, reach the Prussian batteries with their projectiles, he recalls that, as early as 1867, attention had been directed to the superiority of the Prussian artillery; yet that he (Lebrun) had then received for answer "that the officers would know, by bravery and proceeding to close distance, how to compensate for all deficiencies in the range of the French pieces."

At 7 o'clock (according to work of the Prussian general staff, in the sixth morning hour, V. vol: 2, page 1165) MacMahon was badly wounded by the splinter of a shell; at 7½ o'clock Ducrot, who had taken the command, appeared before Lebrun and communicated to the latter "that the army, as the enemy threatened to close it in on all sides, must forthwith commence its retreat upon Mézières."—Lebrun, who shared MacMahon's view that only from 60–70,000 Germans were to be contended with, and who did not know how matters already at this time stood with the Fifth and Seventh corps, replied: "I am prepared to follow and obey the order which you shall give, but I believe that an order to retreat will have a bad influence upon the young troops, who have hitherto fought so bravely. I beg you will take this into consideration."—Towards 8 o'clock, Ducrot, who had ridden over the position of the First corps, returned and commanded: "There is not a minute's time to be lost; the army will take up the retreat upon Mézières; the First and Twelfth corps will cover it." The Twelfth was to start and to be followed by the First, as soon as the former should have reached the positions at the *bois de la Garenne.* It was now 8.15 A.M.; already, says Lebrun, *the execution of the Ducrot plan of retreat* had become *impossible,* in view of the relative positions of the two sides. As the *fond de Givonne* and the defiles of the *bois de la Garenne* lay in the rear of the Twelfth corps, Floing could not have been reached before 2 o'clock in the afternoon! (Here a contradiction can readily be perceived: Shortly before, Lebrun is still of opinion the French had to do with but 60–70,000 Germans. How could these have hindered the retreat of the "army of Châlons," numbering 130,000 men?!).

Scarcely had the Twelfth corps commenced its movement in retreat, when the *entire First* also left its positions. At this critical moment appeared General Wimpffen, and, as known, by virtue of a secret order of the minister of war, took the supreme command after Ducrot had undisturbedly wielded it for 1¼ hours! Lebrun (a school-mate of Wimpffen and intimate enough with the latter to make the use of the second person singular between the brothers-in-arms easy and familiar) reports that Wimpffen said the following to him: "Bring the movement ordered by General Ducrot to a stand-still forthwith. I want no retreat upon Mézières; if there has to be a retreat, it must be upon Carignan; but we are not so far yet; do thou[3] let thy troops retake their positions again without delay; the Twelfth corps has fought splendidly; thou (turning familiarly to Lebrun) wilt have the honor of the day."—

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[3] As this familiar intimacy between the Generals is not without significance, it has been deemed best to follow the text of the original by the employment of the only approximately equivalent method of expression we have in English, corresponding with the "*Duzen*" of the Germans and the "*tutoyer*" of the French.—TRANSLATOR.

Lebrun replied it would be difficult to reoccupy the abandoned positions. Towards 9 o'clock, the Twelfth corps again commenced its forward movement. The ensuing events are cursorily skimmed over by Lebrun. With regard to the engagement about Bazeilles, he does not hesitate to repeat the mendacious stories about the cruelties reported to have been perpetrated in the town by the Bavarians. Genuinely French is the phrase that the Bavarian soldiers, to revenge themselves upon the unhappy inhabitants, had sped from house to house, "*in the one hand the torch, in the other petroleum,*" (verbatim!) The German reader will know what to think of these tales, related with such an outrageous lack of good taste.

Lebrun very piquantly describes the casual meeting between Ducrot and Wimpffen, who, mutually heaping reproaches upon one another, contended in a very excited manner for their respective theories of retreat. (In a letter addressed from Versailles to Lebrun on the 24th June, 1872, Ducrot still speaks of "*ce misérable de Wimpffen;*" in the "annex" of the work, this communication is literally reproduced). Ducrot finally called upon Lebrun to express his own opinion; the latter diplomatically refrained, "*as it was not his place to give such an opinion;* besides he was even then, as Ducrot could see, busily engaged in making the dispositions looking to the strongest possible resistance." —After Ducrot, putting an end to the consultation, had departed at a gallop from the scene of this remarkable conference, Wimpffen ordered the Twelfth corps, supported by the division Goze of the Fifth, to push forward upon Bazeilles; incontinently thereafter, so Lebrun believes, Wimpffen sent the Emperor a note containing the few lines: "Sire, venez-vous mettre à la tête de mes troupes; elles tiendront à l'honneur d'ouvrir à Votre Majesté un passage à travers les lignes ennemis!"

It was towards 2½ o'clock when "a heterogeneously mixed-up mass of men, horses and carriages (parts of the Seventh corps), precipitated themselves like unto an avalanche from the heights of the *bois de la Garenne* upon the works of the fortification Sedan, to seek protection within it." Lebrun, solicitous lest the panic should also communicate itself to his corps, commanded the post of the National Guard, guarding the sally-port, to close it and to draw up the bridge. This is the time of the celebrated great cavalry attacks, as to which Lebrun's statements very materially vary from those of the work of the Prussian general staff. He says: "the attack was executed, and the legend will have it since 1870, that it was commanded by General Gallifet; not he, but General Bauffremont, ordered the same, after the death of General Margueritte; moreover, Gallifet was not yet at that time a General at all, and, finally, only *one* attack took place."—Two letters published in "*Progrès militaire*," under the title "*La Vérité sur Sedan*" (No: 414 of 18th October, 1884), the one from Colonel Faverot of the Twenty-third dragoon regiment, the other from Major Reverony,—the former, Ordnance officer of General Ducrot during the battle and bearer of the order to General Margueritte; the latter, Ordnance officer of the last-named General,—place in question, in the most decided manner, the correctness of the assertions made by Lebrun. Two attacks (not *one*) took place, the first, at 8½ o'clock in the morning, executed by the brigade *chasseurs d'Afrique*, under General Gallifet, to whom General Margueritte, in a loud tone of voice, in the presence of numerous witnesses, gave the order to attack; the second, towards 2 o'clock, in the direction of Floing, executed by the *entire* division, again commanded by General Gallifet (in the place of General Margueritte, who had shortly before been mortally wounded); the bearer of *this* order was the above-named Colonel Faverot.—The testimony of the two officers mentioned, whom we must acknowledge as competent witnesses, has *not* as yet been disproved on the part of Lebrun; the "*Journal des débats*," in which the two letters first appeared, gives vent to its condemnation of the fact that France furnishes the spectacle to Europe, of how the army, fourteen years after the war, still continues to hesitate to come forward with the actual truth; it further calls upon the minister of war to convene without delay a commission of inquiry, to the end that the events of this unfortunate day may at last be clearly ascertained and historically established, beyond the peradventure of contradiction.

It was about the time of the second great cavalry attack that Lebrun betook himself into Sedan, to report to the Emperor and MacMahon the unfortunate progress of the battle. He met the Emperor in the state-house, and was received by the latter with the following words: "How does it happen, my dear General, that firing does not cease, and that the battle is still continued; already an hour ago" (here, unfortunately, definitive statements as to time are lacking) "have I caused the white flag to be hoisted upon the citadel, to put an end to this useless conflict; enough blood has been spilled. I propose to ask an armistice."—"Sire," I answered, "I know nothing about this flag, which has not been observed from the field of battle; notwithstanding, I would not have ceased firing, for it is not customary, according to the laws of war, to ask an armistice during the progress of a battle, through the hoisting of a white flag."—"Well, but how is it done, then?" asked the Emperor."—"One sends the bearer of a flag of truce (*parlémentaire*) to the highest in command of the hostile army, with the request in writing for the granting of an armistice; the General-in-chief alone is the proper person to send such a flag."—When the Emperor, moreover, called upon me to undertake this duty, I replied to him, that as commander of a *corps d'armée*, I must hold out at its head to the last, but that I could suggest my chief of staff, General Gresley, for this purpose. "Very well, then," said the Emperor, "set on foot at once a request for an armistice."—"Sire," replied I, "that is General Wimpffen's affair; he must sanction and sign the request, and in his capacity as General-in-chief of the French army. I hope to find him upon the field of battle, and will, if he approve, send my chief of staff, General Gresley, to the Prussian headquarters."—In a few lines I framed a suitable request, and putting it at hand about me, left the cabinet of the Emperor to seek out Wimpffen. When on the point of quitting the prefecture, I observed that I was followed by a non-commissioned officer, who had fastened a white flag to the point of his lance; it turned out that the officers of the imperial suite, taking me for the *parlémentaire*, had on their own responsibility fitted out the non-commissioned officer with the white flag, with instructions to follow me. Between Bazeilles and Balan I met Wimpffen. As he discerned the white flag behind me, he cried out in the greatest excitement, without waiting to hear what I had to communicate to him, "No, no, I don't want any capitulation; away with the white flag; the battle must and shall be continued!" After I had in detail explained to him the true state of affairs, and had told him that I had reluctantly come to beg his approval and signature of the proposed request for an armistice, I handed over the note to him and asked him to take cognizance of its contents, adding, "Do thou now seek out forthwith the Emperor and impart thy resolves to him." Wimpffen took the note and rode off in the direction of Sedan, and I further called out after him that I would look up my troops and would continue the battle. In the belief that Wimpffen would reflect upon the matter and seek out the Emperor, I repaired to my corps, which I had left two hours before in the "old camp," and thence to Balan, where the brigade Abatucci (of the Fifth corps) was engaged in heavy fighting. Riding back to the old camp, I met Wimpffen; it was 4 o'clock in the afternoon; he had in fact sent to the Emperor, as I now learned, the other above-mentioned note, containing the words: "Sire, venez-vous mettre à la tête de mes troupes," etc.; not a word had been said about capitulation. The General now asked me if it would be possible with the few troops that were available, to break through in the direction of Bazeilles. To this I answered in the negative, but added: "As thou makest the proposition to me, forward then." Turning to my officers, I called out in a loud tone of voice: "Get your men together and follow me: forward!"—A little parcel of about 1200 men took up the march, General Wimpffen riding to my left, my chief of staff to my right. That this undertaking was unfortunately an act of desperation I could not conceal from myself. A veritable rain of musketry fire was immediately poured forth upon the little column, which, thoroughly broken up, sought protection behind the houses on the wayside. We had only gotten 400 metres forward!—Wimpffen turned to me and said, "There is nothing more to be done; order all the troops to take up the retreat upon Sedan. *I lay down the chief command; thou wilt take the command in my place!*"—I answered, that his turning over the command to me at this moment was absolutely out of the question, and could not be accepted by me; besides, that I was not at all the oldest in rank after him, and in no way entitled to assume command. Then I asked if he gave me the positive order to take up the retreat upon Sedan. To this he replied in the affirmative; whereupon I declared that I would do this without precipitation, and as soon as no soldier should be any longer without the fortification, would cause the gates of the latter to be closed. I rode back and entered the fortress towards 5 o'clock; suddenly, as if by agreement, the fire upon both sides came to an abrupt termination. The battle was over.—

The observations, offered by Lebrun upon the causes of the capitulation, afford no new points of view; one thing is new, namely, the fact related by him, that an entire cavalry brigade (it is not mentioned which it was) had, as early as 8 o'clock in the morning, left the battlefield upon its own responsibility. Following the Belgian frontier, by way of Maubeuge and Landrecis, without being attacked, these troops reached Paris, where, in recognition of their "heroic conduct," a splendid ovation was prepared for them by the government of the national defense. Two other brigade commanders followed this example, with a portion of their regiments, at a somewhat later hour, and were received with equal honor and distinction at Paris![4]

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[4] It is not uninteresting to compare how Sarcey expresses himself with regard to the fugitives from Sedan, in his excellently written, liberally spirited work, "*Le Siège de Paris.*" He says, (p. 69): "De toutes parts, il rentrait dans Paris des fuyards de Sedan, les uns qui avaient passé par la Belgique, les autres, qui

In the last conference which Wimpffen had with the Emperor, the former (so says Lebrun) is said to have expressed himself very bitterly with regard to the Generals, to whose disobedience he attributed the loss of the battle. Wimpffen had implicit confidence, at the time he assumed command, that the movement planned by him for an advance in the direction of Carignan would prove successful; he even promised the Emperor "*that he would throw the Prussian army into the Maas,*" just as MacMahon, in inordinate misappreciation of the situation of affairs, had given expression to the same utterance, on the eve of the battle of Beaumont. Lebrun is of opinion that Wimpffen's attitude is only to be explained by ascribing to him an undue vanity and self-appreciation, in no sense commensurate with his actual military abilities.

Within the fortress, after the capitulation became known, there ensued mutinous scenes of the worst kind: the cry of "treason" was raised and the officers were insulted.

With regard to the conclusion of the capitulation we learn the following details: As was to be expected, the Emperor had not sanctioned the retreat of Wimpffen, and called upon him to enter into communication with the chief in command of the German troops, in order to secure the most favorable terms possible. Before Wimpffen repaired to the headquarters of the adversary, he assembled the Generals and put to them the question whether it would be possible to hold the fortress. Three Generals, Ducasse, Pellé and Bellemare, referred to the example of Masséna in Genoa, and wished to continue the fight for the possession of the fortress; the remainder negatived the question proposed to them. On the morning of the 2d September, at 8 o'clock, Wimpffen again assembled the council of war of the Generals, and communicated to them the substance of his interview with Count Bismarck and General von Moltke. The French Generals, says Lebrun sarcastically, were justified in putting to each other the question, how General Wimpffen could even for a moment have expected better terms from the chiefs of the hostile army, which he had "wanted to throw into the Maas." Not very appropriate nor accurate, moreover, is the allegation of Wimpffen (repeated by Lebrun) that the declaration had been "magnanimously" made on the part of the Germans, that nothing stood in the way of the release of the officers upon parole. The work of the general staff indicates, (p. 1288), in close print, that a request

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s'étaient évadés de la capitulation; *d'autres, il faut bien dire aussi, qui s'étaient prudemment tenus loin de la bataille, et avaient pris leurs jambes à leur cou, aussitôt la défaite connue.*"

of this kind had been made *on the part of the French.* Lebrun declared in the council of war, that not a single officer would be so lost to a sense of duty as to give adhesion to this clause of the capitulation, and added: "Fortune is variable. Who knows if the prisoners of war of to-day may not yet come into the position, before the end of the war, of taking up arms again?"—

Towards 9 o'clock, while deliberations were still going on in the council of war, there was announced a Prussian "Colonel" (it was Captain Zingler of the general staff), who gave notice of the resumption of hostilities at 10 o'clock, if a conclusion should not have been reached in the negotiations. Lebrun made use of the opportunity to ask Captain Zingler, how it came that the German infantry had shown itself so little in the battle;—that only in Bazeilles had the Bavarian infantry found itself within the range of the fire of small arms. To this, Zingler is represented to have answered: "that the entire army, in view of the superiority of the French rifle over the German, but of the pieces of the German light artillery over those of the French, had been ordered to avoid, if possible, an engagement with the French infantry and to attack the latter especially, with artillery fire."—That the answer was in no case made in *this* form, requires no proofs for the German reader other than those inherent in the allegation itself. The "order" referred to in this manner, was, in consideration of the inordinate losses in the battles fought in the month of August, nothing more than a direction to the infantry, "not untimely to allow itself to be carried away by enthusiasm and rashness, and, especially when assailing strong positions, to await the effect of the artillery fire!"

At 2 o'clock, Wimpffen returned to Sedan with the protocol of the capitulation. Upon a scandalous scene, which manifested itself when the latter was made known, Lebrun reports as follows: A brigade commander called the officers of his regiments to him, to bid them farewell. Scarcely had he spoken a few words, when he was interrupted by a Colonel with the brutal speech: "What, you want to say farewell to us? Pray, do we know one another? How long is it since we have been under your command? In sooth, you have not seen your regiments a single time; have never concerned yourself with their affairs, etc." With difficulty did General Fénélon succeed, upon his appearance, in putting an end to this painful episode.

As to the stay of the captured army on the Maas peninsula Iges, denominated by the French "*camp de misère,*" Lebrun develops interesting accounts. The complaint made against the German authorities, with regard to the care and subsistence of the captured army, of "utter disregard or unqualified cruelty," is, to say the least, a very ill-advised and unfounded one. Those who have had occasion to know that even the German troops, which had remained behind to guard the prisoners, endured literal need during a number of days and saw themselves compelled to do with the most meagre rations, can comprehend, what difficulty must have been experienced, suddenly to provide, in that impoverished country, for an entire prisoned army. Railway communications were moreover interrupted; the requisitions were insupportable; the dispositions of the commissariat of the German armies had been calculated with a view to a direct advance along the Marne, and it was impossible, upon the change in the lines of operation, to ensure the prompt and immediate following of the reserve subsistence supplies. Why was there such a dearth in the *French* army, of every species of stores, and why does not Lebrun direct his complaints against the *French* departmental arrangements, which he hurls into the face of ours?!—That horse-flesh was largely eaten by the prisoners, has no significance whatever; that was the case also, here and there, with *German* soldiers, without any especial ado and fuss having been made about the matter.

In the spoils of war, there figure, in a significant manner, only one eagle and two flags; Lebrun says that the remainder had all been burnt up on the 2d September. He further gives expression to reproaches, in that the officers had been deprived of their arms, but does not know, or remains silent about the fact, "that it had been consented that the officers retain their arms, provided they would obligate themselves by their word of honor in writing, neither to take up arms against Germany up to the close of the war, nor otherwise to become active against her."—

Upon the journey to Pont à Mousson, which Lebrun accomplished accompanied by the officers of his staff, he was repeatedly insulted in the rudest manner as well by inhabitants, as also by late soldiers, who had already reached their homes in disguised apparel. On arriving at Pont à Mousson, he received, as did also Ducrot and the other officers, permission to move about freely until the departure of the railway train, under the condition not to escape. We learn that two officers of Lebrun's staff, *not* regarding their parole, relieved themselves of restraint as prisoners of war, by adopting the dress of civilians. Lebrun declares such a course would have been incompatible with his honor. Ducrot, it will be remembered, was of *another* opinion as to the point of honor. —Of General Bellemare it is reported, that he had already escaped in disguise from the camp at Iges.

After remaining a short time at Coblenz, Lebrun was interned at

Aix-la-Chapelle. Of his life there he writes in a very contented manner; says that French was universally spoken there and that many inhabitants recollected, and were proud to speak of it, that they had once been Frenchmen, (a compliment, for which the citizens of Aix-la-Chapelle will scarcely be disposed to be thankful to Lebrun). We further learn that the government of the national defense had caused General Lebrun to be called upon, through an emissary, to withdraw from his captivity by a violation of his word of honor, in which event an important command in the Army of the North would be secured to him. The General disdainfully rejected the dishonorable proposal.

Herewith the experiences of the author are brought to a conclusion. In a chapter entitled "Epilogue," he makes a few observations, offering little that is new, upon the causes of the French reverses and as to the reorganization of the army after the war. Comprehensive appendices contain the reports upon the participation of the Seventh French corps in the battle of Sedan; further that of the artillery of the Sixth corps, in so far as the same had been assigned to the Twelfth corps; and, finally, the protocols and correspondence upon the subject of the mysterious hoisting of the white flag in the fortification, which had been ordered on the part of the Emperor, after he had conversed with Ducrot and Douay.

The work of Lebrun, although in many respects to be used only "with caution," fetters historical interest in an uncommon degree. From the stand-point of a truth-loving desire for accurate historical research, the fact that it has given, and will yet give, occasion to many interesting revelations, can be greeted only with pleasure.

THE ELECTRIC LIGHT ON BOARD THE FRENCH ARMORED SHIP "RICHELIEU."

INSTALLED BY SAUTTER–LEMONNIER, PARIS.

(From *Mittheilungen aus dem Gebiete des Seewesens*, by Lieutenant W. H. Beehler, U. S. Navy.)

Introduction.

The electric light has been generally introduced on board naval vessels with special application for torpedo-searchers, and for throwing beams of light, by means of projectors, in any desired direction; but as yet the electric lighting of the interior of war-vessels has been limited, and may be said to be still in its infancy.

All thorough experiments prove that the use of incandescent lights is far superior to the ordinary methods of lighting. With an important reduction in the cost, the lighting is richer and more agreeable, the danger of fire is diminished, the service of the lights is under better control, the ship's position lights are more powerful and better visible at greater distances, and, finally, night-signals can be made to a relatively great distance and much more rapidly.

Passenger steamship companies, which have a due regard for the comfort of their passengers, have generally introduced this system of lighting on board of their steamers, and numerous descriptions of their systems have been published.

But the peculiar conditions to be fulfilled on board of a war-vessel render the installation so complicated that a thorough description of the plant and the arrangement of the circuits recently so carefully introduced on board the armored ship "Richelieu" cannot fail to be of great interest.

The "Richelieu" is lighted by two hundred and twenty-seven incandescent lamps, of which two hundred and eleven eight candle-power lamps are used to light the ship's rooms, while sixteen thirty candle-power lamps serve for the position lights, mast-head light, and tactical night-signals.

Any number of these lights may be extinguished without affecting the intensity of the light of those which remain lighted, and without the necessity of introducing extra resistances in the circuits.

The electric machine automatically regulates the current as required. The change in the work of the motor, which is necessitated by these variations, remains constantly proportional to the number of lamps lighted in the circuit; and also, in spite of the variation in the work required, the speed of the revolution of the motor remains constant, this being controlled by a special differential regulator, which operates to control the steam-power.

The dynamo-electric machine requires from twenty to twenty-five horse-power, and makes five hundred and eighty revolutions per minute. Notwithstanding the high speed and the amount of work to be developed by the motor, due regard was had to the space available, and the use of beams and sills for the support of the plant, while no other coupling but direct gearing could be permitted. And as the system must remain at work during the entire night, it is necessary to use the least possible amount of steam, and at the same time maintain five hundred and eighty to six hundred revolutions per minute. All these conditions are fulfilled by Megy's high-speed motor, especially adapted for this installation by Sautter-Lemonnier & Company.

Another difficulty to be overcome consisted in maintaining regularity in the revolution of the dynamo, so that for all practical purposes there should be but a little deviation, which would soon disappear, after a considerable number of lamps were lighted or extinguished. Megy's differential regulator satisfied these conditions perfectly.

With the exception of the Edison lamps (any others might have been used), every detail of this installation is new, and was especially developed for the lighting of war-vessels.

MEGY'S HIGH-SPEED MOTOR.

All parts of this engine are made as light and small as possible out of steel or phosphor bronze. The moving parts are carefully and accurately made and balanced. The peculiar feature of the engine consists in the method of using the steam. This makes it possible to utilize the steam economically, notwithstanding the high speed and the necessity for maintaining this speed uniformly, no matter how great or how sudden may be the change in the amount of work to be done. A condition absolutely necessary, as one or all the lamps may be extinguished or lighted. This is done by means of the expansion valves.

The steam is not wiredrawn, but admitted direct into the cylinder, the expansion cut-off alone controlling the amount of steam admitted.

The engine occupies a space of one cubic meter. All parts are solidly encased, so as not to be injured by the rolling of the ship, and at the same time it can readily be taken apart should occasion require.

The motor which is in use on board of the "Richelieu" has worked well independently of the source of steam supply. An auxiliary boiler was first used to supply the motor with steam, but subsequently it was found desirable to use steam from the main boilers, with an excess of pressure of about five pounds. The motor worked satisfactorily by simply increasing the admissions period.

This motor is an excellent high-speed engine, and can be utilizd on board of a cruiser in many ways besides driving the dynamo-electric machine.

MEGY'S DIFFERENTIAL SPEED REGULATOR.

This an attachment to the motor. It is enclosed in a cylinder three feet high and ten inches in diameter. It consists of a weight supported by an endless chain over a system of wheels. The weight is at one end of a bent lever to which a rod is connected, which connects directly with the expansion cut-off.

There are two cogged wheels in the upper part of the cylinder which engage the endless chain, while the bight between them travels under a wheel at the centre; the outer bight travels under a wheel attached to the weight at the lower part of the cylinder. The two cogged wheels in the upper part revolve normally in the same direction, so that the weight remains at the same height as long as those two wheels have the same velocity. One of the cogged wheels is geared to the motor and has the same speed as the motor; the other is connected to a fan, whose wings fly out on opposite sides, and at the normal speed offer a resistance to the air, which remains constant as the speed.

If the number of lights in the circuit is decreased there will be less work to be performed. The motor will suddenly be relieved of work and revolve faster, but at the same time it will revolve the first of the two cogged wheels in the regulator faster than the normal speed. This cogged wheel will travel faster than that which is attached to the fan, and it will therefore raise the weight attached to the endless chain. Then the weight will, in rising, operate the rod connected with the expansion cut-off, and this will reduce the steam admitted into the cylinder, and thus reduce the speed to the normal velocity.

If, again, some or all of the lights which had been extinguished are relighted, then there will be more work required, and the operation of the regulator will in turn tend to lower the weight, and its attached levers to open the expansion cut-off that more steam may be admitted as necessary; and the weight will resume its normal position, while the wheels, the fan, and the engine will revolve at their normal velocity.

This regulator operates to maintain the speed of the motor constant, and reacts immediately upon the slightest change in that velocity.

THE DYNAMO-ELECTRIC MACHINE.

That used on board the "Richelieu" is a Gramme machine of type *ID*. The current strength is two hundred ampères, though two hundred and fifty ampères can be obtained without injury to the machine.

The difference of potential at the poles is fifty-one to fifty-two volts by the normal speed of five hundred and eighty revolutions per minute. The internal resistance of the machine is only .008 of an ohm.

The characteristic peculiarity of this dynamo is in that the difference of potential at the poles remains constant independent of the number of lamps in the external circuits, such that the intensity of the current in the external circuit varies as the product of the number of burning lamps multiplied by the constant 0.75, no matter what may be that number of burning lamps. This property is a direct result of the extraordinary small electrical resistance of the rotating armature, and also because the field electro-magnets are excited by branch current. The chosen proportion between the internal and external resistances also conduces to maintain the constant difference of the potential at the poles.

The field magnets are in juxtaposition, and when excited yield a current of twenty-two ampères.

The armature is of peculiar construction. It is built up of one hundred bars of good conducting copper, which have a trapezoidal cross-section, such that when laid together they form a cylinder about seven inches (or one hundred and eighty millimetres) in diameter. The bars are insulated from each other by pasteboard soaked in asphalt.

The ends of the cylinder thus formed are turned down to form the collector. Radial copper pieces are bolted by copper nuts perpendicular to the bars of copper forming the cylinder, at three inches from their ends. These bolted copper pieces are also soldered with tin.

The cylinder is then covered with an insulating layer of linen saturated with rosin, upon which iron wire is then wound. This forms the soft iron core of the inductor, which is again wrapped by a layer of linen soaked in rosin.

The core of the inductor thus formed is next covered by a second layer of copper bars with trapezoidal cross-section. The second layer of copper bars are shorter than those of the first layer, and recessed at the ends so that they fit over the radial copper pieces bolted and soldered to the first layer of copper bars. When fitted over the radial pieces the bars are soldered to them. In this manner the radial pieces connect the bars in the two layers so that they form a continuous spiral conductor from the two layers of copper bars. In the outer layer the bars are also insulated from each other by pasteboard soaked in rosin. The completed inductor is then wrapped with linen bands secured by brass wire soldered on to hold all parts of the armature firmly.

The electro-magnets are formed of eight round pieces of iron three and one-eighth inches in diameter, uniting the platform with the upper cover, and supporting cast-iron pole-plates at the centre.

The electro-magnets are supplemented by six half-columns of soft iron which unite the pole pieces to the lower platform and cover. The columns of soft iron become powerful electro-magnets when the branch current flows in their magnetizing spiral. The wire forming this magnetic spiral is 0.17 inch in diameter, and each column has two hundred and seventy-two feet of this wire. This wire is so wound on the field magnets as to produce the poles as in all Gramme machines.

The brushes are of silvered copper wire, and similar to those generally used with the Gramme machines.

The inductor is rotated by means of a pulley, which is driven on and secured to it by means of eight wedges let into the cylinder and secured to twenty-four of the copper bars, which are a little larger than the remaining seventy-six, so that they project within the cylinder.

This built-up dynamo-machine is extraordinarily solid. For this service it is capable of feeding four hundred lamps of eight candle-power, or two hundred lamps of sixteen candle-power with five hundred and eighty revolutions and a force of twenty-five horse-power. The number of revolutions may, however, be increased without injury to the dynamo up to nine hundred revolutions, in which case the electro-motive force will be doubled, and twice the work performed, so that it could feed eight hundred lamps of eight candle-power, or four hundred of sixteen candle-power.

This strong construction occupies a space of about three feet high by three feet square. The Megy motor and differential regulator occupy the same space, so that the total space required for motor and dynamo is seven feet by seven feet by three feet,—one hundred and forty-seven cubic feet.

THE CIRCUITS.

The two hundred and twenty-seven Edison lamps are arranged in following circuits:

No. 1 circuit, for day service.
" 2 " night service.
" 3 " battle.
" 4 " the machinery.
" 5 " service when under steam.
" 6 " the position lights.
" 7 " night signals.

Each of these circuits has its own conducting-wires, which unite at a common key-board in the vicinity of the dynamo-machine.

There are a certain number of lamps in each circuit which are only occasionally used, which are provided with independent switches, so that these lamps may be lighted or extinguished independently of all other lamps. All such lamps on the berth-deck, or in other places easily accessible, are under lock and key, so that they may not be interfered with by unauthorized persons.

The completely insulated conducting-wires are supported in wooden tubes secured to the ship's sides, and also in metal pipes.

Forty-eight circuit-breakers (safety contacts) divide the system into that number of groups, so that in case there should be any strain upon the wires, or in case the intensity of the current became so great as to endanger fire, that group of lamps would be automatically cut out of the circuit.

The five first-named circuits have a common return conducting-wire, which terminates at the general key-board. The other two circuits, being more exposed to injury, have each their own return-wire, which also terminate at the key-board in a special switch designated for that purpose. The wires of these circuits may also be detached from the rest of the installation.

The area of the cross-section of the wires and the position of the branch circuits are so chosen, by calculation, that the electro-motive force at the ends of the conducting-wires of the most distant lamp does not differ more than one volt from that at the key-board.

As the difference of potential at the poles of the machine remains practically constant, the aggregate current strength is always constantly proportional to the number of lamps lit in the circuits. It is only necessary to turn the switches to light, or to extinguish, one or any number of lamps without any necessity for regulating the current strength. It is, however, to be observed that a certain interval of time should be allowed, in order that the regulator may have time to adjust the power for the differences in the work required.

1. The circuit for day service is designed for use both day and night, and contains sixty-eight lamps of eight candle-power. These are used in the holds and lower portions of the ship where daylight does not enter. Forty-five of these lamps are provided with separate switches; these are in the store-rooms, where a light is only occasionally necessary.

2. The circuit for night service is designated, as its name implies, for illuminating the berth-deck cabins, mess-rooms, and saloons at night. This contains seventy-nine lamps of eight candle-power, fifty-eight of which are provided with independent switches.

3. The circuit for battle contains sixteen lamps of eight candle-power for the magazines, shell-rooms, etc.

4. The circuit for the machinery is to light the engine-room and fire-room when at anchor. It contains twenty-six lamps of eight candle-power divided into two series. This circuit has a switch-board in the engine-room, where the lights of the circuit are under control. The Series A of this circuit contains eight lamps (two for the shaft alley, one in the fire-room, and five in the engine-room). These give the necessary light for all the passages in these spaces. The Series B contains eighteen lamps, which can be used in examining the engines or when making repairs.

5. The circuit for service when under steam contains twenty-two lamps of eight candle-power, which completely light up all parts of the engine and fire-rooms when under steam.

6. The circuit for the position lights contains six lamps of thirty candle-power, three of which are for the peak lanterns, two in the side-light lanterns, and one in the mast-head lantern.

7. The circuit for night-signals contains ten lamps of thirty candle-power, which may be hoisted aloft. The two conductors for this service are led up from the general key-board to two screw-posts in the signal deck-house. Two coils of cable, made up of six separately-insulated cables, are used for the conductors between the lamps and the manipulator in the signal-house. As the hoist of the signal-lamps is regulated so that the lamps are one fathom apart, a pair of the conductors branch out at every six feet to connect with the lamps. Five of the six conductors connect with a lamp, while the sixth serves as common return, so that five lamps may be used in one hoist of each coil of cable, or ten lamps when both cables are used. A peculiar key

or circuit-closer is arranged so that one or any number of the lamps may be lit as required.

From the foregoing it will be seen that the following lamps are in use:

			Lamps.
In port.	Daily.	Day circuit	68
		Machinery circuit	26
		Total	94
	At night.	Day circuit	68
		Night circuit	79
		Position light circuit	4
		Machinery circuit (Series A)	8
		Signal circuit	10
		Total	169
At sea.	Daily.	Day circuit	68
		Machinery circuit	26
		Steaming circuit	22
		Total	116
	In battle during day.	Battle circuit	16
		Total	182
	At night.	Day circuit	68
		Machinery circuit	26
		Night circuit	79
		Steaming circuit	22
		Position light circuit	6
		Signal circuit	10
		Total	211
	In battle at night.	Battle circuit	16
		Total	227

THE LAMPS AND THEIR FITTINGS.

All the lamps except those in the circuit of the position lights and signals have a light intensity of eight candles, and require fifty volts electro-motive force and current strength of .75 ampère. This light is sufficient to illuminate the rooms designated.

The body of the lamp differs according to the nature of the place to be lighted; due care being taken so that the lamps may not be affected by the vibrations of the bulkheads, etc., to which they may be secured, caused either by the travel of the engines or from the shock of the discharge of the guns. With these objects in view, the lamps are fitted as follows, viz.:

1. A felt disc, about one-half of an inch thick, is placed between the lamp-bearer and the place to which it is secured.

2. Each lamp-bearer is secured by spiral springs with wood screws, so that the effect of the vibrations of the air and of the bulkhead to which it is secured will be materially diminished.

In the state-rooms, and especially on the berth-deck, where the crew sleep, the lamps are placed in lanterns provided with lock and key. These lanterns are similar in shape to the standing berth-deck lights in general use, and are provided with a polished reflector over each incandescent lamp within the regular lantern.

The incandescent lamps in the engine-room are also covered with a concentric glass globe but little larger than the incandescent lamp. Some of these are portable, and are provided with lengths of cable and rings by which they may be hung up in any desirable place.

The lamps in the admiral's saloon and officers' cabins are fitted on elegant candelabra, nickel-plated, and furnished with porcelain shades.

Those in the steerages and engine-room are somewhat plainer, with galvanized candelabra. A special fitting is adopted for the gauges and water-level glass in the fire-room, consisting of a projecting arm arranged to support the lamp conveniently for those instruments.

For the magazines and shell-rooms a wooden socket-holder is fitted in the regulation light-box and an adjustable length of wire is fitted so that the electric incandescent lamp may be readily replaced by the present regulation candle or *vice versa.*

The lamps for the running side lights (position lights) are similarly arranged, so as to be readily replaced by the ordinary lights. As these lights are outboard, they are provided with water-tight covers. When the electric lights are used, the conducting cables reeve through a hole in the cover secured by a screw-cap. When the ordinary lights are substituted, this cover is taken off and another replaces it, so that it may remain water-tight.

SIGNAL-LAMPS.

The signal-lamps, as well as the position-lamps, have a light intensity of thirty candles. These lamps are placed within the ordinary signal-lanterns by means of wooden sockets fitted in the candle supporter, which carries two screw-posts by which they are connected to the conductor cables. When all the lamps are fitted and connected to the cables, they are hoisted aloft together, and carry the cables hanging down; five of these lamps are used on one cable to be hoisted at the main-mast, and the others at the mizzen by the other cable. They are not lighted until after they are hoisted.

The manipulator is in the signal-house on deck. It consists of a wooden box with glass cover, arranged with ten switch-keys, which are operated by being pushed over to one side to make and break circuit. The switch of the return-wire is also movable, and it must be moved to make contact before the circuit can be completed. This arrangement is also fitted with small incandescent lights in branch circuit in the box, and when the desired signal numbers are switched in, these lamps form the signal inside of the manipulator-box before the circuit in the signal-hoist is closed. If the desired signal is correctly picked out, the execution switch is turned, and the signal appears in the signal-lanterns hoisted aloft. This scheme permits the correction of any error in the signal desired before the same is displayed aloft. When the signal-lights are extinguished by the main switch, it operates automatically to cut off the circuit of the lamps in the manipulator, so that at the same instant all the signal-lights and those within the manipulator are extinguished and ready for any other signal.

The following is a list of naval vessels fitted or about to be fitted with incandescent electric lights:

England.—"Inflexible," "Shah," "Raleigh," "Bacchante," "Active," "Colossus," "Conqueror," "Polyphemus," "Inconstant," "Rupert," "Nelson," "Invincible," and "Orion;" and new cruisers "Racer," "Mariner," "Linnet," "Leander," and "Reindeer." The troop-ships "Himalaya," "Malabar," "Crocodile," "Euphrates," "Orontes," "Serapis," and "Jumma."

Germany.—The gunnery ship "Mars," the "Preusen," "Frederich Karl," "Kron Prinz," and "Grille."

Italy.—"Italia," "Duilio," "Lepanto," and "Ruggiero di Lauria."

Spain.—"Numancia."

China.—"Chen-Yuen."

Austria.—"Erzherzog Albrecht."

Brazil.—"Riachuelo," and "Aquidaban."

Denmark.—"Fyen."

France.—"Richelieu," and transports "Chateau Yquem" and "Chateau Margaux."

United States.—"Trenton," "Omaha," and in the new cruisers "Dolphin," "Chicago," "Atlanta," and "Boston," when these vessels are completed; but the three last-named are not to be fitted with auxiliary boilers, and it is doubtful if the incandescent electric lights can be economically used if the main boilers are to furnish the steam constantly, day and night, for a whole cruise.

The reports on the incandescent lights on board the U. S. S. "Trenton," installed September, 1883, show that the plant has been very successful. This plant is known as the Edison system, and contains one hundred and seventy-three lamps of ten candle-power, seventy of sixteen candle-power, and four of thirty-two candle-power. The plant occupies one hundred and one square feet of surface, and the dynamo is six feet four inches high. The engine is the Edison Company's C engine, "Armington and Sims." This has a governor, which preserves a uniform number of revolutions independent of the load (within the limits of the power of the engine).

The leading wires are of three sizes, 12 and 14 and No. 18, for connecting to the lamps. These wires are inclosed in pine-wood mouldings, and on account of the working of the vessel water leaked behind this moulding and caused trouble, with poor insulation.

The lighting plant was put in operation on September 18, 1883, and has run almost every night since. No difficulty has ever been found with the engine or dynamo, and no repairs of any importance have been required. The governor of the engine apparently worked perfectly during the first six months, but its use was discontinued after April 4, 1884, when it was found that the lamps lasted very much longer.

The plant was in operation for 6203.5 hours during 444.5 days up to January 1, 1885, and averaged nearly 14 hours daily. On three occasions, one of ten days, one of two, and one of one day and a half, the fires were hauled in the boilers, and the plant was not in operation for want of steam. The expenditure of the lamps has been gradually decreasing. During the first period, from September 18 to December 31, 1883, or 104 days, there were 364 lamps expended. In the first quarter of 1884, 334 lamps were expended; in the second quarter of 1884, 78 lamps were expended; in the third quarter of 1884, 65 lamps were expended; in the fourth quarter of 1884, 50 lamps were expended. And from the experience thus gained the minimum expenditure has not yet been reached.

Two incandescent electric deck-lanterns were very successfully used for night signaling; these were placed a certain distance apart, connected to a key-board arranged that one or the two could be lighted, and then signals were made by means of the Meyer's Code.

During the regular target practice every quarter, the lamps and their fittings were not injured by the concussion of the air except in one case, that of a lamp near the cabin galley about eighteen inches from the breech of a gun when run in. This lamp had no spring fixture. Considerable glass was broken elsewhere in the ship during target practice, such as the glass of station bill frames, cabin window-panes, etc., while none of the electric lamps were removed.

During a heavy gale on December 14, 1884, the table in the admiral's cabin got adrift, and striking the four-lamp electrolier, broke two shades, two lamps, and the casting connecting the electrolier to the deck above. Many of the lamps expended are accounted for by similar accidents during the cruise.

The four American systems of incandescent light will be installed in the United States navy. The Edison system is in use, as described, in the "Trenton" and in the "Dolphin." The United States Electric Light Company are to put the Weston Maxim system on board the "Atlanta." The Anglo Brush Company will have their Victoria dynamos and Brotherhood engines in the "Boston," and the "Omaha" now has the installation by the Consolidated Electric Light Company. The contract for the "Chicago" has not been awarded as yet.

The effect upon the frail glass lamps by the concussion of the air by firing the heavy guns was tried in the fall of 1882, on board the English armored ship "Devastation." Twenty-two lamps of the Edison, Maxim, and Swan patterns were placed in and around the turrets. Four Swan lamps were secured upon the breech of one of the 35-ton guns. Some of the lamps were connected with the dynamo and lighted, while some were left disconnected, and therefore not lighted. After firing the gun with full service charge, two of the lamps were broken by the sudden vibrations; the others were uninjured. This experiment proved that when the lamps are properly secured, as provided for on board the "Richelieu," they will not be affected by the concussion of the air when the guns are fired.

THE FUNCTIONS OF CAVALRY IN MODERN WAR.[1]

BY MAJOR GRAVES, TWENTIETH HUSSARS.

PART I.

WHEN the extraordinary effect of improved firearms began to be realized, and their capacity for rapidity of fire increased and their range extended, many were found who said that the days of the usefulness of cavalry were numbered, and that that branch of the service would sink into insignificance.

I think it can be maintained, however, that the functions of cavalry in modern war, in leading up to and following after the actual battle, have, owing to this very improvement in modern firearms, attained to a far greater importance than formerly, and imperatively demand a greater amount of intelligence, self-reliance, resource, and efficiency from the individual than ever before.

With reference to the *general characteristics* of cavalry, we may gather from various sources, as well as from the nature of things, that, compared with those of other arms, there are some characteristics that have remained constant from the earliest times, viz., greater mobility, dash, vigor, and boldness. It is therefore more potent to seize passing opportunities, and this power gives its known presence, especially at the commencement of operations, a certain moral influence which exercises a certain prohibitive or paralyzing effect on the other arms. For instance, should the cavalry be supposed to be in force, the opposing artillery will not be so ready to come into action on elevations, advantageous for fire action, but difficult to support or retreat from; again, infantry might find the zone of its fire action limited by perhaps having to refuse a flank that otherwise might have effectually swept some important means of approach open to the enemy.

On the other hand, cavalry has always been and is more costly, more difficult to train, more easily thrown into disorder, more difficult to rally when so disordered, than the other arms. It is specially weak on the flanks, and has little power except on the offensive, and when dismounted, owing to its power and effect in the former case, being dependent upon the united action of man and horse.[2]

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[1] Read before the Royal United Service Institution.

Cavalry is no longer able by a brilliant charge to so open an engagement that the infantry have little to do but finish what the cavalry had so well begun. Now artillery, as a rule, opens the actual engagement and prepares the way for the infantry, dealing first with the opposing artillery until its own infantry commences to advance, and then turning its attention to the enemy's infantry, though still endeavoring to silence the artillery of the enemy. Thus covered and aided in their advance, the infantry rush in where the cavalry, except under the most favorable circumstances, dares not advance, and, let us suppose, carrying the position attacked, drives the enemy out headlong, and thus leaves the cavalry, now issuing from concealment, to finish in pursuit what the artillery began.

Formerly, we saw the cavalry boldly exposed in full view on the flanks of an army; now they are withdrawn from that position, and are generally to be found, ground, cover, and other circumstances permitting, concealed behind or in echelon on the flanks until an opportunity arises for action.

We read that in former days the slaughter wrought by cavalry in a single battle often amounted to thousands, and not seldom to tens of thousands. Now we see that the bullet has the pre-eminence in death-dealing, for, in the Franco-German war, out of sixty-five thousand one hundred and sixty Germans killed, but two hundred and eighteen were killed by sabre and clubbed musket. The killed by the sabre in six months, including Wörth, Vionville, and Sedan, together with the battles of the Loire and the northern provinces, as well as in the outpost services, extending over nearly half of France, was six, notwithstanding that there were forty thousand cavalry engaged.

We should remember, however, that while in former times the victories upon which the fate of kingdoms and empires often depended were won by cavalry, and that this will seldom occur again, yet it is held by military scientists of high order that—to use the words of Jomini—"an army deficient in cavalry rarely obtains a great victory." Why? Because the functions of cavalry in modern war, antecedent and preparatory to, as well as consequent on the battle, have become of greatly increased importance owing to the character of the very fire which has diminished its value in the actual engagement. Further, because no victory can be a truly great victory, the results of which have not been fully reaped in the turning of defeat into rout, and in the complete dispersal of the routed, and the prevention of their re-forming for another struggle. An army deficient in cavalry cannot fully reap that which its artillery and infantry may have well sown.

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[2] The early history of cavalry has been omitted for want of space.—Ed.

An able commander, in view of an approaching engagement, will seek to place his troops on the chosen position in such a condition, mental and physical, that they shall give practical expression to their several functions in a way to produce the greatest possible results. In order to produce these results they must be cheerful, eager, yet cool, confident without being careless, and be determined; in order also that their physical condition should correspond to this frame of mind they should have marched without having been hurried or harassed unnecessarily on the way, their supplies should be constant, and their communications safe. When *halted* they should have rested in comfort because consciously secure.

The functions of cavalry are intimately connected with the production of a force in position in such a state.

In relation, therefore, to an army at the *halt*, cavalry have most important functions to fulfill.

An army at the *halt* may be likened to a person at rest with eyes and ears open, seeing and hearing every movement going on around, and yet without dread or alarm. During this state his eyes should have such long sight, his ears should hear so acutely, that the remaining faculties and members of his body should never be surprised into a state of unpreparedness for action; but having received timely notice of approaching danger, resistance to that danger should have a fair chance of being effectual.

Let us suppose a picket of cavalry forming a unit in the outposts, or standing screen, of an army at the *halt* is expected to carry out the duties of eyes and ears for that army: what should be before the mind's eye of its commander? The purpose should be twofold: subjective and objective. Subjective, in that knowing the supposed direction of the enemy and the amount of front he has to guard and watch, he should place his picket—concealment from the enemy being duly considered—on the route the enemy would most likely take in approaching. This position should have uninterrupted communication with the support, and, as far as possible, lateral access to the flank pickets. Such cover as is obtainable should be taken advantage of. A point where cross-roads meet, if otherwise suitable, would be best. He should then go with his vedettes to the nearest commanding elevation in front; he makes that his centre of observation, and places vedettes right and left in such a way that they can see each other and the dismounted sentry over picket as well if possible, his flank men being in sight of the flank vedettes of the neighboring pickets. Objective, in that these men so placed should, without being seen, watch all the means of approach and all the enemy's movements when in sight.

The question may here suggest itself as to what extent of country a cavalry picket of thirty to fifty strong could thus guard? Clery gives instances which show that the extent of country covered and watched by outposts requires numbers that may vary from one hundred to one thousand per mile of country, governing circumstances being the character of the country, the state of the atmosphere, the strength and activity of the enemy, etc.

Now, these duties carried out thoroughly should guarantee the main body security from surprise and time to prepare for action. But this is not enough! It is not sufficient to know that the enemy is or is not coming. It is necessary to know something of his composition, his strength, of his intentions, his habits, his times for relieving, etc. These points can in measure be ascertained by a good system of patrols, which, sent out at uncertain times, and keeping up the touch laterally, should, as circumstances permit, push forward to the front and find out all they can, reporting even the most trifling things that they may observe concerning the enemy.

The proper functions of outposts are observation, screening, and information rather than fighting; the latter is only resorted to when pressed by the enemy, the vedettes are driven in on the pickets, and the supports, and perhaps the reserves, have to reinforce them.

Should the enemy press on, the outposts should delay his advance, and so give the main body time to get into position, and, making good use of information gained, fight to the best advantage.

Lord Wolseley, writing on this subject, says, "With us, unfortunately, outpost work is mostly regarded from a defensive point of view. . . . If this duty was regarded more as an active than a passive one, that is, if it was ruled that the primary object to be attained was to obtain information about the enemy's doings, whereabouts, and intentions, the result would be twofold, for not only would the army be protected from surprise, but the general would be supplied with most valuable information."

Two examples may suffice to show the value of a standing screen of outposts in the case of an army at the halt.

First, as to the question of "*rest.*" The night before the battle of

Tamai our army got but little rest. Why? They were in such a position that regular outposts were an impossibility. The enemy were closer to the main body than the line of pickets would have been under ordinary circumstances, the result being that all through the night bullets were flying about most uncomfortably near, and rest was to most an impossibility. Several alarms added to the discomfort. Had the enemy been of another type, or had they possessed arms of precision in large numbers, and known how to use them, I don't suppose the army would have halted for the night where it did. Allow me to quote an eye-witness: "The evening of the 12th was troublous, for about 5.30 P.M. the rebels began to show thickly on the ridge about one thousand yards to the left face. Four 9-pounders were dragged on to the rising ground on the left face to disperse them. . . . The rebels . . . blazed away all night, and hit horses and men, but under the bright moonlight they did not like to come too close, and it is suggested that they were daunted by the preternatural silence of our men lying down in their squares. If there ever was a case in military history where *rest* was impossible, this is one. Harassed and worried as well as sleepless all night, in a continual state of mental tension, we cannot be surprised to read that 'our men could not easily be got, despite trumpet calls and officers' shouts, to reserve their fire and aim carefully;'" farther on we read the ugly word "panic." All this tends to show that it is necessary for an army to have complete rest during its halt before an engagement.

Secondly, as to *security*, I don't know a better example of the value of outposts, and specially patrols, than that afforded by Tel-ed-Kebir. Lord Wolseley was good enough to write to me as follows:

"It is quite true that I ascertained by my own reconnoissances of the enemy's position at Tel-el-Kebir, and from those made by others, that Arabi had no outlying pickets at night, and only posted them at dawn every morning." What a feeling of satisfaction must have prevailed in the general's mind when this state of things was ascertained as a regular habit! Owing to this suicidal omission on the part of Arabi, what did it cost him? What did it save us? Suppose his front and flanks had been covered by a good watchful screen,—suppose, added to this, he was served by a number of small daring patrols, moving, as they might have done, two or three miles in our direction all through the night, what would it have cost us to have taken Tel-el-Kebir? It saved us a long weary night's work for the cavalry, and gave them something in hand for their famous pursuit and marches on Zagazig and Cairo. It enabled us to form line of battle from the outset, and come up unobserved to striking distance, unharassed, silently, confidently, and without confusion, and then—victory.

We will now consider the functions of cavalry in relation to an army *on the march.*

As it is necessary for an army at the *halt* to have a standing screen to afford it rest, security, and information concerning the enemy, so it is as necessary for an army on the march to have a *moving* screen in front for the same and additional purposes.

In writing of these duties and functions, General Von Schmidt says, "We shall have, therefore, to fulfill the same tasks again, but this time with more difficulty, since the enemy will not fail to employ his cavalry division in the same manner, on which account observing without being seen, reconnoitring and screening duties will be considerably more difficult. So much the more, then, will it be incumbent on us to make this part of our duty clear, and to keep the guiding principles before our eyes, if our arm would perform this so important part of its *rôle* in a manner demanded by the safety of the army."

Again, with special reference to the country traversed, Von Schmidt writes, "The cavalry officer, therefore, cannot be too familiar with, or too highly instructed in, this branch of his duty; to see well and accurately, to observe the ground always from a clear military point of view, to realize its capabilities in relation to the working of troops, and to judge it accordingly."

With regard to topographical information, a good map is invaluable, an honest guide most useful; but the officer using both must know how to avail himself of their aid to the advantage of his commander. He must have a clear idea as to what is required by and will be useful to that commander,—a map and guide cannot tell him everything; for instance, a map cannot tell him the state of roads, depth of streams, character of fords, density of woods, fabric of and accommodation afforded by buildings, supply of water, amount of forage, grain, cattle, cartage, etc., available. The weather and time of year so affect most of these that personal observation becomes absolutely necessary.

A good map may indicate a strong and commanding position, but personal observation may show that the weather has rendered it difficult of access, etc. Jomini gives two very striking instances of want of topographical information. First, "In 1796, Moreau's army, entering the Black Forest, expected to find terrible mountains, frightful defiles and forests, and was greatly surprised to discover, after climbing the declivities of the plateau that slope to the Rhine, that these, with their spurs, were the only mountains, and that the country, from the source of the Danube to Donauworth, was a rich and level plain." The second example was in 1813: "Napoleon and his whole army supposed the interior of Bohemia to be very mountainous, whereas there is no district in Europe more level," etc.

In these cases the means of transport that were supplied and used with a view to the difficulties of a mountainous country fortunately suited a level country sufficiently well not to interfere with the rate of progress; but reverse the above circumstances; suppose a level country to have been anticipated, would the means of transport available have suited the tracks and paths over mountains? Would there not have been incalculable and disastrous delay? Hence the necessity for clear, correct, precise, and constantly supplied topographical information. Hence, therefore, the necessity of cavalry well trained in the important work of procuring and supplying it. The importance of efficiency in this work cannot be overestimated. We can only deal with the matter generally, but I cannot but draw attention here to Colonel Bowdler Bell's translation of Captain de Biensan's "Conduct of a Contact Squadron" as a most valuable book, opening out the details, and putting the conduct of a squadron in a most interesting manner,—and to memoranda issued by General Fitzwygram, on Cavalry Detached Duties, to which is added much useful information on other matters. But to go back to the general question. There are many very striking cases of flagrant neglect on this point, from which we may learn lessons and draw conclusions. Curious to say, generals noted for carefulness one time become notorious for carelessness another. For instance: The French and Austrians met on the march at Solferino in 1859; the French had 124,500 infantry, 10,700 cavalry, and 300 guns; the Austrians had 146,000 infantry, 15,000 cavalry, and 700 guns; they knew nothing about each other's whereabouts until they met.

In the German official report, 1866, we find that four hundred thousand men fought in the battle of Königgratz, and it is stated that the outposts of the two armies faced each other within a distance of four and a half miles without either army suspecting the near and concentrated presence of the other. Clery has an excellent chapter on this head, though one would prefer a different division and definition of these duties. He gives some very striking instances of disaster due to neglect of these duties. Macdonald, on the Katzbach, trusting to reports that Blücher was in retreat, and taking no precautions to verify them with his cavalry, was surprised on the march, and his defeat became such a rout that he had to beg the emperor to come in person to restore matters.

In 1870, McMahon's right flank was left unscreened. The result was that, although he had two divisions of cavalry in reserve, his fifth corps was surprised and routed at Beaumont. In tactics the same rule holds good, for "at Waterloo Napoleon neglected to reconnoitre towards Wavre, and became aware too late of the advance of the Prussians."

The necessity of *constant touch* is exemplified by the fact that, after the battle of Austerlitz, Murat's cavalry mistook the line of retreat of the allied army, and so the whole French army pursued on the wrong road.

To obtain the touch of the enemy, and keep it, is all-important in enabling reconnoitrers to find out much about him. This is best done by small bodies, having great mobility, under sharp officers or non-commissioned officers. Von Schmidt says, "The more the enemy sees himself surrounded by 'points' and patrols only which avoid him but constantly return again, and not by tangible bodies, the more certainly will every attempt he may make to break through be frustrated, and the less will he be able to avoid perpetual observation and obtain any information for himself."

Touching the distance in front of an army that the screen should maintain and the extent of front to be covered, Clery gives (p. 43) some useful examples:

"In the advance of the first and second German armies from the Saar to the Moselle in 1870, the cavalry of the second army during the first day's march was pushed forward to points varying from fifteen to twenty miles in advance of the general front. Ten regiments were employed, and they reconnoitred along a line extending from Pont-à-Chansey on the right to Pfalzbourg on the left, about sixty miles. This gave one regiment to about every six miles of front to be reconnoitred."

The second day shows that the same distance in front was maintained, the same extent of front covered by the same proportion of men. On the third day, the enemy being in force in front of the right wing, another division of cavalry was brought up for a close reconnoissance of the enemy's position and movements to the east of Metz. This division was composed of four regiments and one battery, and reconnoitred along a front of only six to eight miles. That these duties, properly performed, exercise a great influence on the actions that follow may be gathered from what Napoleon wrote concerning the disasters that befell him in 1870. He says, "The enemy concealed his movements so well behind the impenetrable screen of cavalry which he threw forward, that, in spite of the most persevering researches, it was never known where the main body of his forces really was."

Having got the touch, and perhaps having ascertained that the enemy is in force, all possible information as to movements, or position, composition, strength, spirit, etc., must be obtained and constantly supplied to the commander. As the main body approaches the front, the screen must become denser and firmer, and must hide all the movements and intentions of the commander, if possible, before he commences to form for action, and as long as possible and necessary afterwards, until the screen is ordered to withdraw and clear the front to enable the artillery to open the engagement. Thus we arrive at our last point for consideration to-day, *i.e.*, "Cavalry on the modern *battle-field*."

It would be absurd to suppose that the dethronement of cavalry from the position it held and the influence it exercised on the field of battle was a thing of a day. Even since the introduction and rifling of firearms, cavalry has done great things, and no doubt will do so again. Actions have over and over again been decided by cavalry even since the thirty years' war; for instance, the battle of Brutenfield; again, in the days of Cromwell, the battles of Grantham, Marston Moor, and Gainsborough. Note, too, the influence of the Uhlans and Cossacks; all these and many other examples show clearly that the days of cavalry were not numbered then. Neither are they now; but the fact remains that the introduction of the rifled barrel, breech-loading action, and the cylindro-conoidal bullet producing great results even, as in the Russo-Turkish war, up to two thousand yards, has made the use of cavalry on the actual battle-field a question of "opportunities" which, recognized, seized, and made the most of, become the stepping-stones to fame of the cool-headed and daring; but neglected and lost, become a very city of refuge for the timid and half-hearted blunderer.

As a general rule, when the cavalry has done the work introductory to the artillery duel, it would be withdrawn behind the flanks or echeloned on them in such a position as would enable it to watch and act against the opposing cavalry, and lay hold of favorable opportunities of aiding the other arms. Let us consider very briefly the action of cavalry *versus* artillery, infantry, and cavalry.

The attack of cavalry on artillery limbered up must necessarily be a matter of opportunity. On artillery in position it must be in extended order, converging from both flanks, or the exposed flank. The purpose of attack should be either to take guns or force them to shift position. In the former case attack should be pushed home, and being so, is generally bound to succeed, a formed body, varying in strength, being kept in hand in support to deal with the support to guns.

At Waterloo the French cavalry made two *front* attacks on one particular battery, but were fearfully cut up and repulsed. During the same battle, Ponsonby, after dealing effectually with the infantry, took the great battery east of the Charleroi road in flank, rode down the whole line of guns, to their utter discomfiture and great loss.

At the battle of Jena, one of Ney's cavalry regiments charged a battery without being supported; they took thirteen guns, but almost at the moment of their victory were in turn routed by the cavalry supporting the battery.

Favorable opportunities for attacking artillery are when they can be approached unseen, or when on the move, when they are engaged in another direction, when they have suffered much loss, or when they are demoralized or unsupported.

Cavalry attacking infantry is a much more serious matter, and in the event of magazine rifles being generally adopted, will become still more so, inasmuch as the cavalry have now to run the gauntlet, in crossing the zone of infantry fire, of some forty shots to one some fifty years ago. What will it be when repeaters are adopted?

If a cavalry leader has the choice, he should charge infantry *up-hill*, as infantry are inclined to fire high. He should attack the right flank if he can, as infantry fire is most effective to the left.

The cavalry regulations lay down that infantry should only be attacked when (1) it is demoralized, or of inferior quality; (2) when from the nature of the ground, or atmosphere, they can be approached unseen and taken by surprise; (3) when already broken and partially defeated by fire action of opposing infantry or artillery and their ammunition is expended; (4) when in skirmishing order, to delay their advance, induce them to close, and so present a better target. I should like to add a fifth point, namely, "while they are performing some change of formation."

I think the affair at Kassassin Lock is a capital example of the first three heads. The Egyptian infantry was of "inferior quality;" it being moonlight, the "atmosphere" aided our men in taking them in a large measure by "surprise," and it had already been a long time "under fire," and, some say, was on the point of retiring. The charge was completely successful, and more than that, the cavalry decided the fate of the battle. Clery gives an incident of the battle of Waterloo, that forms a good example of the fifth point I ventured to suggest: "At Quatre Bras a British regiment, while deploying into line, was surprised by a body of French cavalry, whose approach was concealed by surrounding high corn, and the latter, charging it in flank, completely rolled it up, cutting down great numbers and dispersing the remainder."

The danger of attacking infantry in square, or line even, when not broken or demoralized, may be gathered from a few notable incidents of recent date. The four charges made by the French light cavalry at Sedan are instructive from a prohibitive point of view. Again, when at Flavigny, near Vionville, General du Preuil charged the Prussians, and lost in a few minutes twenty-two officers, two hundred and eight men, and two hundred and forty-three horses, the Prussian infantry did not lose a man.[3]

I think we are in some measure open to the charge of rather underestimating the fighting capabilities of the Eastern and other semi-civilized nations with whom we have from time to time been engaged in war, or the operations of war: this has sometimes cost us very dearly. For instance, at the battle of Aliwal part of the Sixteenth Lancers charged the Sikh squares. The Sikhs opened out, let them in, and then throwing down their muskets they drew their swords and cut the lancers down by the dozen. The casualty return of January 29, 1846, tells its own tale, and conveys a dearly-bought lesson. It runs thus: "Cavalry, first brigade H. M.'s Sixteenth Lancers, 2 officers, 56 men, 77 horses killed; 6 officers, 77 men, 22 horses wounded; 1 man, 73 horses missing." This gives a total of 8 officers, 134 men, and 172 horses placed *hors de combat* in one fight."

The battle of El Teb, in which the cavalry took such a prominent part, also shows us the risk and cost of charging masses of such troops who are not shaken and have not lost heart. An eye-witness writes, "The cavalry charged the masses of the enemy in the open. These footmen, however, would not run, and the troops galloped to and fro among them, knocking them down by the sheer weight of their horses. Although there was in this work but little slaughter, these charges produced an excellent moral effect."

The *Times* correspondent writes, "From twelve till two the cavalry had been riding backwards and forwards through the enemy at the gallop for the greater part of the time."

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[3] During the discussion Sir L. Graham expressed regret that I did not give the Flavigny incidents in greater detail. To have done so would have added about half an hour to the lecture, as it occupied him nearly that time in giving them in the discussion.—F. G.

In General Graham's official telegram we read, "The cavalry were very ably handled and made some dashing charges, but I regret their heavy loss." There were four officers killed that day, of whom three were cavalry officers.

Touching the question of *formation* in the attack on infantry by cavalry, we come to a knotty point, which is of special importance to us owing to our liability to have to cope with infantry who possess considerable powers of fire action, and also with those with limited fire action but great skill with spear, dagger, and sword, combined with a reckless disregard for death.

Our cavalry regulations, Part III., Section 8, paragraphs 22 and 23, lay down that "the best formation for the attack on infantry will be found in the double echelon of squadron from the centre." "A succession of attacks in column over the same ground should never, under any circumstances, be made use of. All attacks should be either convergent or in echelon." That is to say, I presume, in echelon from the centre of at least first line, and in echelon of lines, whatever the initial formation of supporting lines.

On the other hand, General Von Schmidt says, in Part IV., page 156, "Infantry will always be attacked only in flank and by several successive lines following each other; it is necessary that the shocks should follow each other rapidly and that the successive lines should not outflank each other (as in echelon), but should cover." After giving detailed instructions for a regiment and for a brigade he states, " . . . success can only be insured by the repeated quickly following attack of several lines against the flank of the enemy's infantry, all in the same direction and covering each other." Here we have authorities of undoubted worth in direct conflict. With which does the truth lie? I would most respectfully, and subject to correction, submit that the *whole truth* lies with neither.

A careful consideration of the context of both shows, I think, that the key to the objective and conclusions of the compilers of our cavalry regulations, and also that of General Von Schmidt's, is the fire action of modern infantry. This being so, and keeping the effective fire action of modern breech-loading arms in view, one is compelled to conclude that Von Schmidt is absolutely wrong, and that the truth lies with our system. For example, suppose a battalion of infantry in line is attacked on right flank, according to our system it would have doubtless a couple or more companies on the right refused. The two central squadrons would naturally draw the chief part of the infantry fire, and during the greater part of the advance the left squadron of the echelon would be almost out of sight, and the right squadron would reap the advantage of the almost insuperable temptation for infantry to fire at the nearest object approaching under such circumstances. Should a second regiment of cavalry be in support of attack still farther on the threatened flank, it would reap the advantage of being covered from fire by its first line without traversing the same ground. Thus we would have at least four distinct targets on four planes, each differing from the others in its distance from and its angle to the infantry fire. The more rapid the attack, the greater the difficulty in choosing and sighting for a target other than the nearest.

On the other hand, Von Schmidt will have none of an advance in echelon, but brings up his squadrons in line, of a strength, in each line, of from two squadrons up to whole regiments, or even more squadrons than a whole regiment.

He would thus present to the deadly effect of modern breech-loaders successive lines of from two to, say, six or more squadrons in width, each line presenting its full strength in a single target on one vertical plane, and each succeeding line or target covering on its predecessor and traversing the same zone of fire. Let us apply the charge of General du Preuil at Vionville here. He lost in that charge, as already stated, twenty-two officers, two hundred and eight men, and two hundred and forty-three horses without killing one Prussian.—(Remember, Von Schmidt demands rapidly succeeding attacks by the lines in column.)—What would be the condition of the second line in such a case? Why, leaping over, avoiding, or tumbling headlong over their fallen comrades of the first line, their pace checked, cohesion gone, and receiving the benefit of the fire that has passed through the first line increasingly as that target, through casualties, becomes less dense, they in turn would offer an effectual stumbling-block to the third line and would make confusion worse confounded. I think, therefore, we may conclude that, with the present fire action of infantry as the basis of discussion and comparison between our own cavalry regulations and the system of Von Schmidt, truth is on our side.

We must now consider what would be the best formation for attack on infantry with small firing powers, but with indomitable courage, great individual agility, combined with remarkable skill in the use of sword, dagger, and spear.

The cavalry regulations say, "A succession of attacks in column over the same ground should never under any circumstances be made use of." I think that an exception should be made in this case, and that the formation insisted on by Von Schmidt should be the rule.

A double echelon from the centre becomes after contact practically a line. If supported by a second body in echelon, the attack in time takes the form of a single bent line, the added part being bent round the refused flank of the infantry. This was probably the case at Aliwal, but when the lancers pulled up for the *mêlée*, the front rank men of the Sikhs who had escaped the first shock turned round and took them in rear and cut them down with ease. The lancers, having no support, had to get out of the trouble as best they could, after losing eight officers, one hundred and thirty-four men, and one hundred and seventy-two horses.

At Meangunge, on the other hand, Sir Hope Grant carried out Von Schmidt's system almost to the letter. The Ninth Lancers charged in the first line, supported immediately by the Seventh Hussars, and then by the Irregulars. The lancers rode right through the infantry, who had no time to repeat the Aliwal tactics, for they were beset by the hussars, and yet again by the irregulars, the lancers having in meantime come about and taken them in rear. In short, the result was a loss to the infantry of five hundred killed and wounded, and four hundred prisoners. Did time permit, other instances could be brought forward in support of this view.

In considering the attack of cavalry on cavalry on the actual field of battle, the leader who can find and seize an early opportunity of attacking the enemy's cavalry advantageously and of rendering it useless, would be in a position to render perhaps most valuable support to the other arms. Such an opportunity should be watched for by patrols or even by single non-commissioned officers or officers. The enemy's position having been thus reconnoitred and the desired opportunity having arisen, rapidity and boldness become the keys of success. Remaining in squadron columns as long as possible to manœuvre against the front and flank desired; that position attained, the best formation of attack, as a general rule, is double echelon from the centre. The charge, the "life element" of our arm on the battle-field, must combine cohesion with the greatest obtainable impetuosity. "No depth, the ranks complete, and only two of them." "The officers well in front." "The stretching gallop of about six hundred to eight hundred paces duration, calm and uniform, without confusion or rushing." The actual charge should cover from fifty yards (cavalry regulations) to one hundred and one hundred and fifty (Von Schmidt). "No sword or lance should be inactive in the charge." The cavalry leader should strive to be first with the enemy, and not allow him the initiative. "He must attack with *les armes blanches*, and on no account with firearms. The second or supporting line works outwards towards the exposed flank and cuts in at the critical moment or manœuvres against support of enemy. Woe to the cavalry misleader who with no third line commits the whole of his first and supporting lines to the conflict and does not retain a formed body in view of eventualities! Success, as a rule, remains with the side that has the last formed body in reserve on the spot required and ready. For it should be remembered that the weakest moment of a successful cavalry force is the moment after its success! No better example of this could be presented than the two famous charges in the battle of Leipzig on October 16, 1813. Denison thus describes them: "At the very outset a most brilliant charge was made by two regiments of Russian Cuirassiers, led by Lewachow against the French right. Soon afterwards Napoleon ordered an attack in great force against the allied centre and left. Kellerman, at the head of six thousand horse, advanced boldly against Lewachow, overthrew him, and was carrying all before him when the Austrian Cuirassiers, six regiments in all, arrived at the critical moment and instantly charged vehemently on Kellerman's flank while he was pressing on with ranks disordered by success. The fresh reserves and the flank attack at once settled the fate of the combat; Kellerman was routed and driven back to the protection of the artillery and infantry, where he soon re-formed. This charge saved the Austrian left centre from defeat. Shortly after this combat the French cavalry, under Latour Maubourg and Murat, tried to force the Austrian right centre. They attacked to the number of four thousand to five thousand without either second line or reserve, and charged the flank of Prince Eugène's infantry, threw it into confusion, rode down ten squadrons of the Russian Guard, and took a large number of guns. The whole centre seemed broken. The Emperor of Russia ordered the Red Cossacks to charge one flank of the victorious French cavalry, and Barclay with the reserve cavalry to support this attack. This was done when the French leader, Latour Maubourg, was wounded, their horses blown, and their ranks disordered by the capture of the guns, and the whole mass was pierced through and routed, twenty-four guns were recaptured, and the French were driven back with enormous loss to their own lines." Thus, in this one battle, in the course of a few minutes, were two victorious charges of cavalry turned to defeat, owing to the neglect of holding reserves in hand.

Another instance of still more recent date shows that well-led, good cavalry may, under exceptional circumstances, do great things on the field of battle against the three arms, as was the case at Leipzig.

At Mars-la-Tour, on August 16, 1870, the Brandenburg division was thrown forward to check Bazaine's advance guard on the Verdun road. The description given in the *Army and Navy Gazette* states that this division was sorely pressed; that a French battery galloping into position on its right flank opened a very galling fire on its already decimated ranks. Then from under cover of a small hamlet called La Ferme, wheeled the Seventh Bismarck (Magdeburg) Cuirassiers, which charged up the incline at the battery. They reached it, captured it, and cut down the gunners and horses as they were being limbered up. At this moment two French infantry regiments opened fire on them. The Seventh charged them at once. The Frenchmen threw down their arms and lay down on the ground as the cavalry rode over them. Then on either flank of the Seventh Bismarck's appeared a regiment of French cavalry. To the right and left they wheeled, and charging home drove them both off the field into the woods, then re-formed, and trotting back came again upon the same two regiments of infantry. At them again they went, and cut them up badly, *but* what did it all cost? They went into this charge eight hundred strong, and came out two hundred and fifty.[4]

Thus we see that cavalry may still, under favorable circumstances, and in spite of the improvement in infantry fire, do great deeds on the battle-field, though, generally speaking, its action there will be limited to the taking advantage of opportunities, in most cases created for it by the other arms. These chances occur in almost every battle, and, rightly used, they may very materially affect the final result. Infantry, covered in their advance by artillery, may carry the position aimed at, at a certain cost, but the same result might be obtained at less cost if the enemy's flanks were threatened by a large force of cavalry working just outside the zone of fire, and drawing a certain amount of attention from its own infantry's advance.

Cavalry attacking cavalry might drive them off with a certain loss, but the loss might be doubled and the moral effect of the victory increased tenfold were the victorious cavalry linked, as is now the tendency, with horse artillery. Leaving the guns full scope to shatter that part of the front nearest the flank to be attacked, the cavalry could choose its own time to cut in and lay hold of the opportunity made for it by the guns. All this should be practiced in peace time much more than it is.

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[4] I understand that this summary was published as having special reference to the Seventh Magdeburg Cuirassiers *only*, and not as a description of the whole cavalry incidents of the 16th so clearly detailed in the discussion by General Sir Beauchamp Walker.—F. G.

To sum up this part of our subject.

The bullet of to-day has dethroned the lance and sabre of the days of chivalry from the place they then held on the battle-field, and occupies their place with far more deadly effect. To produce that effect in its greatest obtainable degree, the men who shoot it must be placed in the best possible position; the choice of that position depends largely on the work of reconnoitring being efficiently performed; hence the increased importance of efficiency in this direction. To reach that position in a state, psychic and physical, of rest and confidence, the infantry must not only have marched in conscious security behind the fan thrown out by the advanced guard, but also behind what Napoleon called "an impenetrable screen," thrown far out in front. Again, at the *halt* they must have rested, unharassed by constantly occurring alarms, behind a screen sufficiently far in front, etc., as to give ample time to form for action.

The fulfillment of these screening and reconnoitring functions devolves on the cavalry, and taking into account the small number we have compared with continental powers, taking into account the increased attention they give to these functions, it is incumbent on us, if we would successfully cope with them, to see to it that our eyes are long-sighted, our hearing acute, and to this end encourage in an ever-increasing degree individual efficiency, self-reliance, and resource among officers, non-commissioned officers, and men, of the cavalry branch of our service.

(To be continued.)

GENERAL GORDON'S LIFE AND LETTERS.[1]

CHARLES GEORGE GORDON came of a hard-fighting stock. His great-grandfather served under Sir John Cope, his grandfather fought with General Wolfe, and when he himself was born at Woolwich in 1833, his father was a distinguished officer in the Royal Artillery. As with others who have ultimately belied the predictions of their childhood, he was a delicate boy, and according to his own showing anything but a pattern cadet when he came into training for his future profession. It is told of him that when a child at Corfu, where his father held a command, his terror of guns of all descriptions was extreme, and that he would hide his head anywhere to escape the sound of firing. It was no test of pluck. The sailors used to encourage him to throw himself into the sea when they were swimming round the ship, and with perfect confidence he would leap towards them, utterly fearless. But at Woolwich most of his early days were passed. Fine opportunities lay to his hand as a lad, when he had the run of the gun-carriage department, nor was he slow in turning them to account. A carpenter made him a huge crossbow, with which no less than twenty-eight squares of glass were broken at extreme ranges one Sunday afternoon! Nor would matters have ended here, in all probability, had not an infuriated officer brought things to a climax when a screw stuck into the wall of his room, just missing his head as he sat reading. A squirt was next constructed for him by one of his friends in the yard; it held a quart of water, and would throw a jet on to the windows of the cadets' lecture-room, which it was his highest ambition to get within the line of fire. He used to describe the long chase one of them had after him, till a friendly turning in the fortifications, whose every nook and corner was familiar to him, just hid him in time for escape.

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[1] 1. "The Story of Chinese Gordon." By Egmont Hake. London, 1884.

2. "Colonel Gordon in Central Africa." By George Birkbeck Hill, D.C.L. London, 1881.

3. "Ismailïa." By Sir Samuel W. Baker, Pacha. London, 1874.

4. "Charles George Gordon, a Sketch." By Reginald H. Barnes and Charles Brown. London, 1885.

5. "Papers Presented to both Houses of Parliament—Egypt No. 1." 1885.

6. "Unpublished Private Correspondence, 1877–85."

His time came to enter the walls of the Academy in due course, and it was an irksome period. Probably he began to feel even thus early that the restraint inseparable from military life was in his case abnormally difficult to bear, and throughout the whole of his career he was very conscious of it. Certain it is that he and the Woolwich authorities did not get on well together, and Gordon was kept longer at the Academy than any cadet of his time.

But we find him with his commission at last, in the Royal Engineers, taking his full share of the terrible work in the trenches before Sebastopol (1855), and curiously enough, laying the beginning of a lifelong friendship with Lord Wolseley, who was sent for special service in the batteries to which Gordon was attached. He drew upon himself much notice from his extreme fertility of resource and coolness of head under specially trying circumstances; once he was slightly wounded, but his escapes were extraordinary. Nor did his active duties end with the fall of Sebastopol. At no time was his life in greater danger than when he was told off with other officers of his corps to destroy the docks and the enormous gates which led to the harbor of Sebastopol. A shaft was sunk, one hundred feet deep, to get fairly at the foundations, and at the bottom of this on one occasion stood Gordon superintending the lowering of a blasting charge of five hundred pounds of gunpowder. Something went wrong, and the whole mass fell out of the slings; he had but an instant to step backwards and extinguish the candle in his hand, or the results must have been frightful to all concerned.

Perhaps he never enjoyed himself more than when his duties (on a special boundary commission) subsequent to the Crimean war took him along the Russian frontier. He spent some time in Turkey in Asia, made the ascent of Ararat and other mountains, and visited many places of great historical interest. No one could have gained greater "kudos" for tact, activity, and energy throughout. He had many a story in after-days to tell of men and their manners in somewhat irritating times, when boundaries had to be laid down, nor did his observations end there. With a spice of irony and fun he used to describe the effect upon the very storks which built on roofs, beneath which suspicious heads were playing the diplomatic game of chess. In one of their nests a goose-egg was placed during the absence of the old bird. Gordon went on to relate:

> "On her return she said nothing, but made the best of it. Sad to say, as the gosling developed, the poor stork was driven to dreadful shifts to save him from the public gaze, but all to no purpose. There was a terrible to-do in the whole colony.

First one mother stork would come and satisfy herself as to common rumor by personal inspection, and then another, till they stood in rows, looking daggers at the unfortunate mother of the monstrosity. Finally a solemn conclave was held at a distance, and, apparently being for once of one mind, they all returned and, pulling the wretched gosling out of the nest, dispatched him forthwith. You could almost hear them saying, 'This sort of thing will never do; who knows what he will grow up to?'"

To tell how "Chinese Gordon" won that title is hardly an easy task within ordinary limits. Suffice it to say, that the more one examines the characters of the soldiers he commanded, the enemy he fought against, and the Chinese government officials he was hampered with, so much more is one struck with the astounding military skill he displayed throughout the suppression of the Tai-Ping rebellion. Seldom in history can it have fallen to the lot of one man to stand forth twice and attempt to stay the onward course of two huge rebellions. Gordon sprang into fame by saving the Chinese empire from being destroyed by the Tai-Pings; how he died in staving off the oncoming hordes of the Mahdi in the Soudan, the world will never forget. In each case we find an officer, whose prominent characteristic from first to last was a practical vigorous demonstration of the Christian faith that was in him, engaged in combating the fanatical influence of a religious impostor. Hung-tsue-schuen, at the head of the Tai-Pings in 1862, had many points in common with Mohammed Ahmed in 1884.

Gordon began his task with a force some four thousand strong, men of all sorts, sizes, and nationalities. *Esprit de corps* showed itself at first in keeping up a name for looting and ruffianism. Each one made up his mind to fight for his own land and his own pocket. But we soon find what this somewhat hopeless material became under the magic influence of the young commander, and we cannot do better than give a specimen taken from a fair sample of the doings of the "Ever-victorious army." It was necessary to storm the city of Taitsan:

"This was a great undertaking, and full of peril. The place was garrisoned by ten thousand men, of whom two thousand were picked braves, with several English, French, and American renegades serving at the guns; while his own force numbered only three thousand of all arms. That, however, mattered little to him. He laid siege to the city forthwith. He took some outlying stockades and established his army in the west suburb, about fifteen hundred yards from the gate; he then seized upon the two bridges of the main canal. Working round the town, and keeping out of gunshot, he captured some small forts which protected the Quinsan road, and so cut the two centres asunder. At the distance of six hundred yards from the walls he placed his guns in position, each covered with a portable

> wooden mantlet and flanked with riflemen. Thus prepared, he advanced with his artillery to within one hundred yards, when he opened a scorching fire upon the battlements, rapidly overpowering the fire of the enemy, which was brisk, but not as yet damaging. He bridged the moat with gunboats from headquarters. In two hours he breached the walls, and his stormers crossed to the attack. Suddenly the wall was manned; a tremendous fire was poured down upon the heads of the column; the bridge was pelted with fire-balls, and in the confusion one of the gunboats was captured. Still Captain Brannen gallantly led on his column, and succeeded in mounting the breach. The enemy, headed by the foreigners in his service, met the assault with spears, and the stormers, after a short and bloody conflict, were compelled to retire. Gordon now cannonaded the breach for twenty minutes over the heads of his stormers; they mounted it once more, when the energy of those in front and the impetus of the men in the rear broke through all obstacles, and the breach was crowned. All resistance ceased and the city was captured, and the enemy fled in the utmost confusion, the men trampling each other to death, in their eagerness to escape pursuit."—"*Story of Chinese Gordon*," pp. 70–72.

If we are not mistaken, it was whilst leading his men to the assault on this occasion that Gordon saw the head of a small Chinese boy disappearing beneath the mud and frog-spawn of the ditch, and, for all any one cared, among the frogs he would have ended the seconds that were left to him of life. Making a long arm, Gordon caught the child's small pig-tail, pulled him out, and sent a man to the rear with him, giving him strict orders to see to the boy and produce him at night. We cannot spare space to relate the history of this poor little mudlark, afterwards named Quincey, and well known now in China, but it is one that, with variations, was repeated again and again in different parts of the world all through Gordon's life. When the friendless and he met, and there was a pound left of his pay, that pound soon found its way into a channel which led to another's good.

Soon after his return from his trip to India with Lord Ripon, and his subsequent visit to China, Gordon received a letter and a photograph from Quincey, which caused him unbounded delight. Grouped together and in full fig were Quincey, his wife, his children, and his mother and the nurse; nor must we omit a quotation from the letter, because it is not altogether without its significance, as we see to-day the graceful and affectionate testimony borne to Gordon's worth by the ruling powers in China. Writing from Government House, Hongkong, in November, 1880, he reports to his benefactor:

> "My uncle, the famous Dr. Wong, the gentleman whom you sent for to see you at Government House, has published a pamphlet in Chinese of the advice you gave him, in which you thought of the only remedy that would do China good. The said pamphlets are sold all over the eighteen Provinces, and there is a great demand for them everywhere."—"*Private Correspondence.*"

Gordon would talk freely of incidents like this, but he shared that love of silence concerning personal deeds of valor and the terrible scenes inseparable from warfare, which must have been noticed in the company of brave men. There was little worth remembering in the doings of his foes or friends, for the matter of that, for Chinese soldiers are brutal in the extreme. Stretched on their crosses he came on thirty-six poor wretches outside the walls of a besieged town, and realized, as few can perhaps, the awful nature of death by crucifixion. He had pledged his word for the safety of the chiefs of Soo-chow when the city was taken; to his dismay, he found that they had been butchered in cold blood when his back was turned! Cut to the heart, he threw up his command with intense indignation. But it was positively necessary to overcome his feelings of disgust, in order that the rebellion should not raise its head again when his heel was withdrawn. There is no occasion to trace further the history of this campaign down to the disbanding of the "ever-victorious army," which took place soon after (1864).

Perhaps at no time did his spiritual life gain greater depth and strength than when he led his troops from siege to siege, and from success to success. He was the student of his fellow-men, and the organizer of his own heart's discipline. Even at this period the singular and almost loving view of death which clung to him to the end was strongly marked. At the storming of Kintang he led several desperate assaults himself, and finally fell with a ball through the thick of the right thigh. He once described the sensations which came over him, as he was carried fainting to the boat from loss of blood and in a most dangerous condition; there was quite a tone of regret that ever the "delicious calm dreamy feeling" came to be broken up by nature's stern decree that he must come to, rally, and finally—though long before his doctors would give their sanction—buckle to and fight as hard as ever.

Many stories are told of his six years' residence at Gravesend subsequently (1865–1871), where he was employed in constructing fortifications; it was a term of peace and enjoyment after the excitement of his service in China. Among the poor—especially poor boys and children—he felt himself at home, and he never tired in planning methods for teaching and helping them on in life; it was one continuous flow of the love and charity which was rapidly overgrowing and crowding out almost every other inclination in his heart.

> "To the world his life at Gravesend was a life of self-suppression and self-denial; to himself it was one of happiness and pure peace. He lived wholly for others. His house was school, and hospital, and almshouse in turn,—was more like

the abode of a missionary than of a colonel of engineers. The troubles of all interested him alike. The poor, the sick, the unfortunate, were ever welcome, and never did suppliant knock vainly at his door. He always took a great delight in children; but especially in boys employed on the river or the sea. Many he rescued from the gutter, cleansed them and clothed them, and kept them for weeks in his home. For their benefit he established evening classes, over which he himself presided, reading to and teaching the lads with as much ardor as if he were leading them to victory. He called them his 'kings,' and for many of them he got berths on board ship. One day a friend asked him why there were so many pins stuck into the map of the world over his mantelpiece; he was told that they marked and followed the course of the boys on their voyages,—that they were moved from point to point as his youngsters advanced, and that he prayed for them as they went, day by day. The light in which he was held by those lads was shown by inscriptions in chalk on the fences. A favorite legend was 'God bless the Kernel.' So full did his classes at length become that the house would no longer hold them, and they had to be given up. Then it was that he attended and taught at the ragged schools, and it was a pleasant thing to watch the attention with which his wild scholars listened to his words."—"*Story of Chinese Gordon*," pp. 228, 229.

A well-known anecdote of him is thus related:

> "He had a great number of medals for which he cared nothing. There was a gold one, however, given to him by the empress of China. But it suddenly disappeared; no one knew where or how. Years afterwards it was found out by a curious accident that Gordon had erased the inscription, sold the medal for ten pounds, and sent the sum anonymously to Canon Miller for the relief of the sufferers from the cotton-famine at Manchester."—*Ibid.*, p. 227.

Nor can we refrain from relating that, after spending a day in London the drain on his pocket by, let us hope, deserving objects of charity had been so great that he found only three halfpence in his purse when he got to London Bridge station; it was a fine night, and as he could not travel by rail for want of a ticket, he walked the whole distance to Gravesend!

We next follow him to Galatz in 1871, appointed one of the commissioners on behalf of this country to settle the dispute concerning the Sulina mouth of the Danube. It was there that he first met Nubar Pasha; and while at Constantinople in 1872, a conversation took place between them, which ultimately led to Gordon's taking office under Ismail Pasha as the successor to Sir Samuel Baker in governing the equatorial province on the Nile.

It may simplify the history of Gordon's deeds in Africa if we divide it into three periods.

The first extended throughout the years 1874–76, during which time he was mainly employed in the trying climate of the equatorial province, and to the south of Khartoum. His second sojourn in Egypt was from 1877 to 1879; at this time he was governor of the whole of the Soudan, with Khartoum for headquarters; but he had also to undertake a most irksome mission to Abyssinia on the one side, and to put down rebellions in Darfur and Kordofan on the other, as part of the hard work that fell to him. Lastly, we may consider his disastrous commission at the hands of Her Majesty's government as coming under an entirely different heading.

We do not remember to have seen any notice taken to General Gordon's most extraordinary memory; to those who knew him, however, it appeared little short of a phenomenon, and somewhat akin to the faculty of the "calculating boy." "Now listen," he would say, and then, taking up the last remarks and trivial incidents of a conversation held a year or two ago, he would bridge over the intervening space with a span of his own deeds, thoughts, failures, and successes since parting, which kept one's own brains at the utmost stretch to follow. Yet there was never the semblance of a hitch in the narrative, nor an omission which had to be brought up to the front subsequently. This was one reason why he did not keep diaries during the first two periods we have alluded to. "What is it you want? I can tell you, for I have it all in my head: do you know I never wrote out an order to an officer? it was not necessary. If he wanted to get to one side or the other of my instructions, I would remind him it was on such a day and such an hour, that he stood just on that spot on the carpet, that such were the words I used, and his replies were so and so, and then he would see it was no use."

Very fortunate, therefore, was it that his affection for his sister, Miss Gordon, led him to keep up a diligent correspondence with her throughout all his wanderings, and that his letters for the most part make up a continuous narrative. We can well imagine some of the difficulties which beset the two editors who undertook to prepare these communications for publication, for one "need scarcely say they were never meant to see the light." We sympathize with Dr. George Birkbeck Hill to the utmost when he laments that he has "neither seen nor corresponded with the man whose memoir I have sketched, and whose letters I am editing." The author of the "Story of Chinese Gordon" prefaces his work with an apology "to one: this is Major-General Gordon himself. I have given his life to the world, not only without his consent, but even without his knowledge."

Before we follow him into the depths of Tropical Africa, it may be as well to say a word upon the unsparing exertions Gordon displayed in keeping up his correspondence. Let those testify who know what it is to have a large budget of letters to answer in a damp, relaxing climate! The temperature is over 100°; the ink dries on the pen before three words are written; books curl, as to their backs; mosquitoes are busy at the ankles under the table, and the hands and wrists above it; prickly heat comes and goes,—these are some of the reasons why faithfully-promised letters too often flag and at last cease to arrive at home. How one realizes, for instance, the whole scene in the over-wakeful traveler's night: "I am writing in the open air by a candle-lamp, in a savage gorge; not a sound to be heard. The baboons are in bed in the rocks." Particularly painstaking, when he described a march or a slave-track that had to be guarded, he would illustrate his letters with small maps beautifully worked out, which put to shame many a so-called scientific explorer's work.

During the afternoon of January 26, 1874, the newspaper boys were busy with a rumor that Dr. Livingstone had died in Central Africa. Men compared notes at the evening meeting of the Royal Geographical Society, as they came together to hear Lieutenant Julian Baker, R.N., read a paper on his uncle's exploits whilst leading the khedive's expedition, to whose staff he had been attached; but no confirmation had been received, and the Foreign Office was without news. Busy with his trunks and dispatch-box in very humble lodgings in Cecil Street, Strand, Charles Gordon was preparing to take his first departure for Africa. On the 28th all doubt was at an end, and few will forget the universal sorrow which spread over the world when it became known that the great explorer had ended his beneficent career somewhere among the lakes of Central Africa. Every one agreed that it must be many a day before the misery-stricken tribes who people the slave-preserves of Africa would have another friend like Livingstone. *That very night,* and in a manner dear to his own heart, "Chinese Gordon" stole away from London, without notice, towards that country which was henceforth to become famous through his connection with it. The future historian, when poor Africa has one, will linger over this coincidence. Some even now will deny that it was chance. They can point to Livingstone's body lying dead in the attitude of prayer at Ilala, and ask whether ever answer was vouchsafed so palpably as when Gordon was sent to snatch up the well-worn sword, and attack with fresh vigor the same evils and the same cruelties that Livingstone had dragged to light in the overshadowed land.

On reaching Egypt, Gordon received his instructions in a lengthy memorandum. On behalf of H.H. Ismail Pasha he was to reduce provinces, "hitherto in the hands of adventurers," to law and order; to abolish slave-trading; "to establish a line of posts through all his provinces, so that from one end to another they might be brought into direct communication with Khartoum." The khedive would have had him enter into his engagement with a salary something akin to that of his predecessor; he suggested ten thousand pounds per annum, Gordon settled it at two thousand pounds. Before he leaves Cairo he comes to a very clear and a very painful conclusion: "I think I can see the true motive now of the expedition, and believe it to be a sham to catch the attention of the English people." His predecessor had been entirely of the same mind. Again he calls himself in the same breath "a Gordon who had been humbugged." We rub our eyes over these expressions to make quite sure that we have not stumbled on a page written from Khartoum in February, 1884. But so it was, and he took his departure from Ismail looking for little encouragement or good-will from either Nubar or his fellow-pashas, and in this way he certainly avoided disappointment.

There are no more instructive passages in Gordon's writings than those which deal with the complications of slave-trading, and the suppression of the bloody raids which are carried on to supply the market. We would heartily commend them to the Sangrados of to-day, to whom cutting a slave-stick from a captive's neck, and giving him leave to go to his home, are as the lancet and warm-water jug of the famous doctor. The horrors of slave-trading are not to be cured in this way. No piping of "Rule Britannia" in the deserts of Africa will cause the liberated slaves to dance. Ten to one, when your back is turned, your emancipated one will put the very slave-stick which galled his own neck for hundreds of miles on some other weaker wretch, aye, and drive as hard a bargain over him, body and soul, as his late owner drove in his own case. We have known slaves buy other slaves, and let them out so as to pocket their earnings, and, when it suited their purpose, purchase their own freedom for a time, and sell themselves at a higher price to another master, whose dollars again went to buy more slaves! The truth is, that people who are blessed with liberty are incompetent to judge of the degrading depths to which human nature can be plunged where slavery prevails. It may take a century to scour the stains out that the finger-marks of pashas have imprinted on the natures of the people in Egypt proper,—even were slavery made piracy to-morrow. As for the poor negro tribes, whence the drift of slave-life comes into so-called civilization, it cannot take a lesser time under any process to make them realize the original value set on man's life. Almost without exception the Egyptian officers thwarted the new governor-general, and showed themselves heart and soul with the slave-traders. No dog that has once taken to worrying sheep is less to be trusted than the man who has put dollars into his pocket from slaving transactions,—such was Gordon's bitter experience.

True he had—we cannot say an active staff of European officers under him, for the climate of the Nile near Gondokoro quickly laid them low with fever, and Gordon's time was continually taken up with nursing them. Here is the sick-list at Gondokoro, September 11, 1874, for instance:

> "Your brother. Well, but a shadow.
> Kemp, engineer. Well.
> Gessie. Well; has had severe fever.
> His Greek servant. Ill more or less; result, no work.
> Berndorff, German, my servant. Ill.
> Menzies, German servant. Sent back ill.
> Russell. Ill, cannot be moved; invalided.
> Anson. Dead.
> De Witt, amateur, like Berndorff. Dead.
> Campbell. Ill.
> Linant. Very ill, cannot be moved.
> Long. With King M'Tesa; have not heard of him for six months."—"*Colonel Gordon in Central Africa*," p. 41.

It only enhances, if possible, the estimate we put upon this extraordinary man, when we see that, after his experiences of Egyptian officials and soldiery, he went to save them at Khartoum ultimately. To understand the Egyptian soldier, we may take notes of him from passages like this:

> "Here is an episode. We were encamped at Kerri, without shelter, however, though there were houses close by which I would not allow to be pillaged. Well, a thunder-storm came on when we were in communication with the people on the other side of the river. We got under some trees, when in the midst of the storm several shots were fired, and we were said to be attacked. We sallied out, but I saw no enemy; and then, on the strength of our being attacked, the unruly mob pillaged the huts. My after-impression was that it was all a 'ruse;' that there was no attack by the people, and that my Levantine friend knew the truth. Add to this, some people of my suite fired on the natives on the other side of the river, and so broke off our friendly intercourse. Cowardly, lying, effeminate brutes these Arabs and Soudanese![1] without any good point about them that I have seen.

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[1] We commend these remarks to the attention of those who speak of the Arabs and Soudanese as a noble people struggling for freedom. They have been the merciless oppressors of the unfortunate negroes, who, as in the times of the Pharaohs, have been the victims of their infamous razzias. In many respects the negroes are their superiors. "Even at this day," observes Brugsch-Bey, "the prejudice that the negro is, both in taste and in art, an unprogressive son of Adam, can be refuted by hundreds of facts which prove the direct contrary in an incontrovertible manner in favor of our colored brethren. As representative of Modern Egypt at the two

It is degrading to call these leaders, and these men, officers and soldiers. I wish they had one neck, and that some one would squeeze it! When not obliged, I keep as far as I can from them out of earshot of their voices. . . . It is not the climate; it is not the natives; but it is the soldiery which is my horror. . . . Oh! I am sick of these people; it is they, and not the blacks, who need civilization."—*Ibid.*, pp. 77–80.

However, by dint of unsparing exertions, he had a chain of military posts opened up to Lake Albert Nyassa, and a steamer placed on the lake itself. Many will remember the intense anxiety felt by the geographical societies of Europe to know more of this lake, and many a man would have given a year of his life to be the first to clear up the mysteries concerning its extent, and the question of the Nile flowing out of it. To Gordon such matters were wholly beside the mark. Writing from Laboré, on the 4th of October, 1875, he says,—

"Stanley has done Victoria Lake on west and probably now on east, and I hope he will do Albert Lake, for I doubt if I shall find time or inclination to start on an expedition merely to gratify (a few months earlier than it will be done) the curiosity of men whose names I do not even know; they move in a higher sphere than I do, and I do not feel the least desire to expose my men before due time to an unhealthy voyage. . . . Geographers can take their latitudes and longitudes afterwards; the lake will not disappear."—"*Private Correspondence.*"

But he would find time to cater for the enjoyment of Miss Gordon by observations of a more interesting sort as opportunity offered. Here is a portrait of one of Africa's lions in his den:

"It is curious to watch the ant-lions. They are small insects with a flexible leg. They make a crater and rest in the apex of it, throwing up with the flexible leg, now and then, a shower of sand. Ants walk on the edge and slip down. As they are getting up the slippery bank the flexible leg throws up a shower of sand, and then another and another; till at last, as if in the cinders of Vesuvius, the ant gets smothered, and falls to the bottom, where a pair of nippers takes him into an inner chamber, and dinner is ready. I have just dug a lion out with a spoon; it is the size of a bug of a brown color. It has no flexible leg, but two horns like a cow, with which he spirts up the sand; he always walks backwards."—"*Colonel Gordon in Central Africa,*" p. 86.

Sportsmen will search these records of Gordon's life in Africa for details of elephant-hunting and lion-slaying in vain. The truth is that, although passionately fond of shooting as a younger man, the love of sport, like everything that could act as an "anchor,"or draw him away for a moment to the pleasures of life, had now become extinguished.

Universal Exhibitions, at Vienna in 1873, and at Philadelphia in 1876, I had the much-desired opportunity of exhibiting the most wonderful works in gold and silver, as examples of the finished artistic skill of the peoples of the Soudan, and of receiving prizes for the black artists."—"*History of Egypt under the Pharaohs,*" vol. i. p. 449, Engl. transl.

He had done with sport long before he went to Africa; and if he ever took down his rifle to stalk one of the many elephants around his station, it was in a spiritless, business-like matter,—either the natives or his own men needed food. Those who knew him well must have noticed that he perhaps of all men who have been much in Africa was the only one who had not a word to say for the magnificent scenery which compensates the traveler for many drawbacks. True, he was color-blind, but this had little to do with it. If by chance any expression or allusion in the Bible was cleared up,—as so many are by wanderings such as his, then his quick eye and beautifully descriptive pen would save it as a treasure for his friends; and he labored hard to be the faithful historian for the birds, beasts, and fishes of his province, but it was only in order that his letters might prove more interesting. There was no enthusiasm, none of that common longing to share the glories of a new and splendid scene with others. And yet he was not without abundant poetry in his composition, or he could not have reveled in his Bible as he did. Looking back upon his life, the want we have noticed appears to be a matter for regret. Even a dangerous climate and harassing labors have their safety-valves, and if a man can enjoy sport or natural history in any of its branches, the pent-up high-pressure state of the overtaxed brain obtains relief. But one must be careful not to convey an idea that Gordon was gloomy, morose, silent, or reserved,—nothing could be more contrary to the truth. Witty, a great mimic, picking up ridiculous incidents and tales, he was rare company at all times. Children, when they grow up, will look back on the days in which they knew him, and still think there never was any one so completely after their own hearts. His pocket held all the surgical appliances for doll accidents, and the tools for mending in general. No soured nature can deceive the glance of a child's eye or the gaze of a dog, strive it never so hard to put on appearances.

> "But to come back to our governor-general, his heart was heavy enough in October, 1876. 'Really, the only remedy I can see is the establishment of a good road to this place (Khartoum) from Cairo. This would let light in, and things could not go on as they do now.' [This fully bears Mr. Stanley out in his admirable letter to the *Times* of March 12 last.] 'Thank God He will in His own time remedy these miseries! . . . When a house gives ominous cracks, prior to a fall, one's desire is, like the rats in ships, to leave it; but this proverb is generally used in the sense of "having sucked the orange, throw away the rind," and I do not like the idea even if the cracks are serious. Why should I fear? Is man more strong than God? Things have come to such a pass in these Mussulman countries that a crisis must come about soon.' "—*Ibid.*, p. 198.

He had by this time struck a tremendous blow at the slave trade:

his health had given way far more than he was aware; it had been one perpetual fight between his constitution and the climate; but as we find so often, the very exertions which both mind and body were put to prevented malarial poisoning to a very great extent. The spectre which left Cairo with him had grown in stature, and strode after him day and night,—"a Gordon humbugged." So seizing the spectre by the throat he dragged it down to Cairo at the end of 1876, determined to have it out once for all with Ismail and Nubar, and to quit the service he was employed in. He reached Cairo on December 2, 1876, having been absent two years. He left Colonel Prout, of the American army, in command of the equatorial provinces,—a gentleman who combined, in himself, all the creature of the West-Point officer, the utmost polish and refinement, with a deep and devoted interest in his leader's work: all who knew him will grieve that the climate of the upper Nile cut short a career of such great promise.

The interview between Gordon and the khedive was highly characteristic of the two men. Gordon used to declare that if he had only acted up to his first convictions through life, all would have gone well with him, and no doubt he had a wonderfully far and clear vision. Of Ismail it has been said, by one well versed in Oriental ways, that he could twist any cabinet minister round his little finger in five minutes, and that some extra exertion on his part would enable him to do the same with the whole cabinet. We believe that Sir Bartle Frere was not alone in his estimate of the man. Certain it is that Gordon felt himself quite unable to cope with such powers of persuasion; he used to say,—

> "I went up the palace steps with my teeth clinched,—vowing that nothing should ever make me alter my determination to quit his service. I came down again in half an hour, with every resolve that was in my mind turned inside out."

He now came to London, once more taking lodgings in Cecil Street. He would not admit it, but his friends noticed that he was most severely shaken. It is quite possible that oversmoking (cigarettes) had much to do with his state. A nasty irritation of the heart's action was set up; but Dr. MacKay had pronounced him organically sound at Alexandria, and said that if he would only take complete rest, and avoid worry, he would soon mend. But all rest was denied him. Full of projects for helping the wretched tribes which were preyed upon by the slave-dealers of the Soudan, he did not conceal from those who were busy with plans that have ultimately culminated in the Congo ventures of to-day, his great desire to devote the remainder of his life to the cause of Africa. They, for their part, were hardly likely to forget such a declaration.

Some of his elaborate plans for reaching the stricken tribes from the east coast are before us, in which his old programme was to be repeated. A line of well-defended posts should stretch from the mouth of the Juba River to M'tesa's country, and settlements were to be encouraged around these stations for the double purpose of supporting the garrisons, and affording cities of refuge to all who chose for the first time to taste the blessings of secure protection. But, in the mean time, Ismail was determined that no stone should be unturned to secure his help once more. When they parted in Cairo, Gordon had so far consented to waive his resolutions, and to act contrary to his own inclinations, that the khedive could piece things together into a promise to go back. To this he bound Gordon hand and foot.

A most painful perplexity immediately arose. Was he once more by his presence to give countenance to a sham? Every pasha in Egypt was cursing his honesty and his ideas of retrenchment. He had really interfered with and paralyzed the slave trade, from which Egyptian officials of all ranks gained large sums of money. Twice "humbugged," should he help Ismail to humbug the world? Such were his thoughts when he returned to England—to rest! The better nature of the man utterly loathed the position:

> "The following is the state of affairs with me and H. H. With respect to my province, of course no slave trade exists; but in the adjoining province of the Soudan it is more rife than ever, and no concealment is attempted on the part of the authorities. I saw the inutility of opening new countries to the khedive, when I was convinced that the same lot would fall on the peoples I had conciliated the moment I left; I therefore came to Cairo determined I would no longer be an instrument to this work. I saw H. H. and told him. It matters little what passed between us, but the result was I agreed to go back, on his solemn promise that these irregularities will cease. But he has not the power even if he has the wish to stop these irregularities. . . . What now is in suspense, and on which I have not yet decided is, had I better go back and protect my own province, and trust to God to overrule events so as to bring about the extinction of the slave trade, or had I better break with H. H. altogether? this is the question which somehow or other is not distinct to my mind. . . . You must remember H. H. has little to say to the formation of my province or of its revenue. I have had little or no help from him, and the province owes him nothing."—"*Private Correspondence.*"

Finally, official pressure was brought to bear upon him by the khedive, and Gordon went to Cairo again at the opening of 1877:

> "I went to see H. H. He looked at me reproachfully, and my conscience smote me. He led me in, and Cherif Pasha came in. Then I began, and told him all; and then he gave me the Soudan, and I leave on Saturday morning. . . .

I am so very glad to get away, for I am very weary."—"*Colonel Gordon in Central Africa*," p. 211.

Further on, as he realizes his new undertaking,—

"I go to Khartoum, and thence, after a short stay, to Darfur, which they say is in revolt. . . . Nothing could exceed the kindness of all the khedive's dispatches. He has put Zeila, Berberah, and Harrar under me. 'Ask of me and I will give thee half of my kingdom.' And now for the reverse of the medal. It is the sacrifice of a *living* life. To give your life to be taken at once is one thing; to live a life such as is before me, is another and more trying ordeal. I have set my face to the work, and I will give my life to it. I feel as if I had nought to do with the government. God must undertake the work."—*Ibid.*, p. 218.

It is but fair to say, that once more in the Soudan we find his former bitterness of spirit against his employer very much subdued. There is almost remorse at times: "I have been most unjust to the khedive, knowing, as I do now, the great difficulties in abolishing slavery."

With his extended sphere of operations came also a large addition to the complications inseparable from his position. We cannot do better than quote from a letter written by him, "on the road to Shaka, 11th September, 1877," to a friend, who both in Central Africa and out of it had made the suppression of slave-trading a special study:

"On the 31st of August I was engaged in operations against the insurgent tribes, and everything was tending to the *finale* of the revolt, when I received intelligence that the slave-traders with their troops of armed slaves, numbering some eight thousand, had camped near Dara. [For the previous history of Zebehr Pasha, whose son led this party, see Schweinfurth's 'Heart of Africa.'] I rode eighty-five miles in one day and a half. The slave-dealers asked to see me the night of my arrival. I said I would come and see them the next morning. A huge post awaited me in it . . . and the memoir of Sir Fowell Buxton. I glanced at the first page, and at once thought how right he was in speaking of *energy* being the greatest gift God can give. *Sept.* 2.—I had at Dara two thousand troops of only mediocre sort; all were timid, the fort bad, and I had not the least confidence of victory if it came to war. I rode with fifty men to the slaver's camp, and saw these troops, which I should calculate at four thousand, not eight thousand. I told Zebehr's son and his chiefs to come to Dara. They came, and I told them I knew they meant to revolt, and that I would break them up; they should be paid for their arms, etc. They left me, and then wrote to give in. Then came three days of hopes and fears; half were for attacking me, the other half for giving in. The result is that I think they have all given in, and I am now on my way to Shaka, their headquarters, with four companies. Thank God! He has given me strength to avoid all tricks, to tell them (the slavers) that I would no longer allow their goings on, and to speak to them truthfully. There are some six thousand more slave-dealers in the interior who will obey me now they have heard these chiefs have given in. You may imagine what a difficulty there is to deal with all these armed men. I have separated them here and there, and in course of time will rid myself of the mass. Would you shoot them all? Have they no rights? Are they not to be considered? Had the planters no rights, did not our government once allow slave-trading? Do you know cargoes of slaves came into Bristol harbor in the time of our fathers? I would have given five hundred pounds to have had you and —— in Dara during the three days of doubt whether the slave-dealers would fight or not. A bad fort, a cowed garrison, and not one who did not tremble; a strong, determined set of men, accustomed to war, good shots, with two field-pieces,—then I would have liked to hear what you all would say. I do not say this in brag, for God knows what my anxiety was,—not for my life, for I died years ago to all ties in this world, and to all its comforts, honors, or glories, but for my sheep in Darfur and elsewhere. Let me add to this the fact that my black secretary, whom I had most implicitly trusted and had munificently paid, had (I heard by the same post as your letter) accepted bribes of upwards of three thousand pounds in three months to influence me here and there; needless to say, Nemesis fell on him. Thank God! I *think* it is over with the slave-dealers. I hope to be at Shaka the day after to-morrow. . . . The son of Zebehr Pasha, a nice-looking lad of twenty, who was heart-broken because his sheep would not fight, my heart yearns over. He is a thorough young ruffian, and has all his life lived a life of brigandage, but still I like him, although he hates me: I hope God will change his heart towards me when I get to Shaka. His was a disastrous march to Dara, for he lost by defection more than two-thirds of his troops and his two guns, and all his best chiefs. As for the revolt in Darfur, it was almost at death's door when I left the front to come down to Dara, and so confident do I feel that God will end it, that D.V. I go to Shaka, thence to Obeid, thence to Dongola, thence to Massowah. We only had two combats. Disabuse yourself on M'tesa's character (the late king of Uganda); he is as arrant a slave-dealer as Zebehr once was. . . . I do not deny the existence of slave trade or of slave razzias, but the extent I deny; and I have every means of knowing, and no motive to state anything but the truth. I say also, many, many slaves would refuse their liberty if freed at once; it means starvation with them. The troops Zebehr's son brought against me were armed slaves; had I said, 'You shall be free,' they would have scoffed at me, and it would have been taken as a sign of fear on my part; yet every one of those men were owned by individuals, and if I take them from the owner I must pay the owner. Smart, dapper-looking fellows like antelopes, fierce, unsparing, the terror of Central Africa, having a prestige far beyond that of the government: these are the slave-dealers' tools. Tell them they ought to come to you, for their chiefs tore them from their homes, etc.; they would laugh at you; to their minds they would do the same,—yes, and do it to others."—"*Private Correspondence.*"

The history of Gordon's second campaign in Africa is the "ever-victorious army" over again. His lieutenant, Gessi, had his faults, but want of dash and bravery were not among them. The world will probably never know the wonderful strategy employed, nor the nature of the conflicts they engaged in. Writing to the same correspondent in April, 1879, from Shaka, Gordon says,—

"You know I had (1877) just quieted down the revolt in Darfur, and had got the slave-dealers of Bahr Gazelle in some degree in order; however, through circumstances over which I had no control, they broke out in revolt in 1878. In August I sent up Gessi to combat them, and though he had for some time great difficulty, for they numbered eleven thousand, he has, after eight severe combats, nearly finished with them. I had come up here to support him. With the fall of these slave-

> dealers falls the slave trade of Egypt, for they were its feeders, and the whole of the roots were in Bahr Gazelle. You may imagine the fighting when at the first engagement two thousand four hundred bodies lay on the ground. I took two caravans yesterday, and four others a few days before."—*Ibid.*

Later in June he says,—

> "The campaign is over, and I thank God. I think the slave trade is at an end, at any rate for some time. Zebehr's son is still at large, but he will, with the five hundred fugitives, have great difficulty to escape, for he is nearly surrounded and has no powder. Several thousands of slave-dealers have been killed; for the natives they used to prey upon rose and were armed by us, and they killed a very great many. The few that may escape will have a terrible time of it, hunted for their lives. Since I left Khartoum I have captured some two thousand five hundred to three thousand slaves. . . . Gessi has done first-rate, and deserves every praise. . . . Fiddling about with steamers on the Red Sea, or any other sea, can never do much good. You must get at the roots of the slave trade."—*Ibid.*

During this time, Zebehr Pasha was kept at Cairo under surveillance; his son was ultimately run down by Gessi and executed. Gordon left for Cairo in July, 1879, having narrowly escaped death from fever; indeed, to spare his sister, he refused to tell her of his many illnesses during this campaign. Ismail Pasha had been deposed, and Gordon had no reason to think that his son's accession would bring increased interest or support. But Tewfik had a special and dangerous mission for him to undertake. King Johannis had been troubling the Egyptians much at Bogos, and Gordon had not the heart to refuse the young khedive; so to Abyssinia he went to endeavor to influence the Abyssinians. His description of King Johannis is not an encouraging one: "A man of forty-five years,—a sour, ill-favored looking being. He never looks you in the face, but when you look away he glares at you like a tiger. . . . Hated and hating all, I can imagine no more unhappy man." We may add that Gordon expressed the opinion, just before he left England for Khartoum last year, that for all practical purposes Johannis was utterly useless; no one could deal safely nor to advantage with him. In a moment of furious rage Gordon's life was actually in peril, but his coolness saved him. The king had not been accustomed to hear death spoken of as the occupancy of "six feet of earth," for which the ambassador, by his own showing, was quite ready; so, taken by surprise, he altered his demeanor.

Passing through Alexandria on his way home, he again received good advice from Dr. MacKay. He was to take a thorough rest in England, and not to trouble his mind about anything. Those who have had much experience of malarial poisoning are only too well aware how exceedingly difficult it is to steady the exhausted nervous system sufficiently to follow out such a prescription. Very bloodless, suffering severely from nervous exhaustion and a general disposition on the part of friends to make much of him, he, in an unfortunate moment, was persuaded to accompany Lord Ripon to India as his secretary. In steadier moments he would have uttered the "no" with his lips which was suggested by his convictions: how often in life had he to deplore acting against his own better judgment! We will not linger over his brief tenure of office. He felt that Lord Ripon and he were in a false position, and, *coûte que coûte*, it must be abandoned. It was some relief to him to pay a visit to China, and the advice which he gave to the authorities at their pressing invitation probably averted a war with Russia.

Gordon returned to London at the end of 1881. The excited state of Ireland led him to go and see for himself how far the miseries reported in the southwestern division were true. He returned with a fixed notion that the condition of the people was quite as bad as it was painted. To escape from the excitement inseparable from living in London, he took up his quarters for some time in a Northamptonshire village, with apparent benefit to his health. Shortly after this he paid a visit to Lausanne, and, but for the perplexity of a fellow-officer, who found himself under orders to take up a command in Mauritius much against his will, Gordon would have carried out the greatest longing of his heart at this time, which was to retire to the Holy Land, Bible in hand, there to realize in a higher degree many of the impressions which were so deeply rooted in him. But to Mauritius he would go instead. It is probable that his sojourn there did him far more good than battling with the sharp easterly winds of an English spring; certain it is that he rallied considerably, and at the close of April, 1882, he found himself bound for the Cape Colony at the pressing invitation of the governments.

Our South African difficulties had already passed into an acute stage; but Gordon threw himself, heart and soul, into the difficult position now assigned to him. To venture on details is beyond our scope in describing the excessive annoyance to which he had to submit, owing partly to a half-hearted policy and to low cunning, which out-Caffred the Caffres themselves. We will, however, content ourselves with one specimen, as set forth in Mr. Hake's able description. The Secretary for Native Affairs met Gordon at King William's Town, and requested him to accompany him into Basutoland. Gordon reluctantly gave way, and visited Letsea, the chief who was feigning friendliness to the English government and antagonism to Masupha. The policy of the hour was to set one chief against the other in the Basuto nation; to this Gordon strongly objected. He was asked, however, if he would go as a private individual to Masupha, the secretary knowing very well that Gordon considered Masupha far more sinned against by bad magistrates than sinning.

> "Gordon went, and went unarmed. How he ever got back has been a matter of astonishment to not a few, for while he was negotiating with Masupha as a messenger of peace, Sauer (the secretary) got Letsea to send his son Lethrodi to attack Masupha. The ministerial tactics consisted in allowing their representatives to settle the Basuto difficulty by egging on the chiefs to eat each other up. Of this Masupha was well aware. He had in his camp an emissary of peace, assuming a certain influence with the Cape government, or at all events sent by a Cape minister; while outside his camp he had a warlike demonstration, organized and set afoot by the same government and same minister. Gordon's power of inspiring savages with confidence in his complete uprightness was probably what saved his life at this desperate pass, as at so many others, in so many lands. Masupha, seeing his guest to be no less mortified and astounded than himself, allowed him to depart as he had come."—"*Story of Chinese Gordon*," pp. 395–96.

But the long story of Cape mismanagement could hardly be enlivened, even were we to run the golden thread of Gordon's straightforward honesty of purpose through it. As Mr. Hake says,—

> "And thus it came to pass, that a little more than five months after his arrival in South Africa, Gordon severed his connection with the only country which had proved unable to appreciate the value and use of the genius he placed at its disposal." —*Ibid.*, p. 392.

Dreading the English climate, and far more than this the amenities of English life, he saw every obstacle removed on his departure from South Africa, and so at last he carried out the long-cherished desire, and spent most of 1883 in Palestine.

His sojourn in the Holy Land was the real rest of his life. He would study Hebrew and rub up his Greek. New interpretations blazed out upon him from every other verse of his Bible, as he stood on this or that spot of hallowed association. From Golgotha he sent home four pieces of stone, which lie at the foot of the cross at the east end of the little Northamptonshire church, where the Holy Communion became the solace of his last years. As Mr. Barnes has testified, he sent to Heavitree "not less than two thousand pages of manuscript in letters." Nor was he the sole recipient, for Gordon's pen was never more active than at this time.

But the unrest is beginning: he is alarmed at this self-gratification which he is enjoying. Writing from Jerusalem on the 28th of February, 1883, he says,—

> "I scarcely see any one (query, is this right?). I shall hope God will direct

> me ere long, for somehow I do not think it is. I am very sorry to hear of the king of the Belgians' illness. . . . I see little of the papers, and am glad of it. I think I see how this revolt of Soudan will bring about the suppression of slave trade and slave-holding, like the troubles in America did. How wonderfully God works in all these matters! I am trying, in firm belief, if God will not suffice for me in this world, without external things. He ought to be able to fill our little cups as He fills all the earth. It is the giving up of all, we shrink from. . . . I think this, that it is good for me to be here, but it is only for a time: in reality I ought to be in the east end, at Bromley or Bow, near Leytonstone, with a broken, bruised clergyman."—"*Private Correspondence.*"

The calm is nearly over. In May we see the "mares' tails" in the sky. He had again and again been in close conference with King Leopold, before his departure for the Holy Land, respecting his magnificent venture on the Congo, but only to see the impossibility of his taking part in his enterprise without a flag; new correspondence with the king goes on. A "filibuster" he should be without the necessary flag,—the want of it alone keeps him from going to the Congo.

> "I am like this,—I am still very active in mind and body, and am passive *still*. Am I justified in forcing myself into action? I think not, therefore I content myself in the forced position circumstances have placed me. Had the king of the Belgians' offer afforded me a ray of light, I would have taken it with pleasure, for I wonder how I am thus placed in sloth, *apparently*. As for Lord Dufferin's programme, it is a made-up affair of many minds, and consequently it is not clear exactly what is meant. I expect Lord D. by himself would have made quite another sort of affair: the result to me is apparently *annexation*."—*Ibid.*

Here again is an interesting passage in the same correspondence, dated from Jaffa, September 13, 1883:

> "I am not sure exactly what I shall do. I am now at Jaffa, and have done Jerusalem to my heart's content. Odd it is that very little spiritual life is to be found in Jerusalem among Europeans; they seem to care little for these things. I am in hopes that the sultan's repugnance to the Palestine canal may be overcome, for it would let our government get rid of Egypt, which they will neither take outright and will not let the people take. Eventually we must have rows there, for things cannot last as they do now. The support of an unpopular inefficient government of pashas is not possible for long."—*Ibid.*

Those who are fond of tracing great events to very tiny germs will be much interested in some passages which we extract a little farther on from private letters before us in the same series. Writing again from Jaffa on the 2d of November, 1883,—that is, a little more than two months before his memorable journey to Khartoum,—he says,—

> "About three weeks ago I got a telegram from —— to the effect that Stanley was leaving the Congo in the spring, and King Leopold wished me to take the post and come to Brussels speedily. As I am still on active list, I asked by telegraph —— to ask War Office if they had any objection, telling him to acquaint —— with decision. About ten days ago I got a telegram from the War Office,

saying that they sanctioned it. I then telegraphed to know if January would be early enough for me to go to Brussels, since which I have no reply. . . . I never expected War Office would have given me leave, considering our relations with France and De Brazza. You remember all the history of my visit to Brussels and the promise to the king . . . however, I really do not care whether I go or not; I leave it in God's hands."—*Ibid.*

As a matter of fact the War Office had *not* granted the required leave, which would enable him, whilst holding the rank of major-general in the British army, to take service under the king of the Belgians. But we will let him explain himself how the mistake arose:

"Last time I wrote I told you the government had given me leave to go to Congo. Three days ago I got a letter which showed me that the contrary was the case. The telegram which gave me leave was this: 'General Gordon, Jaffa, Secretary State *decides* to sanction your employ on Congo.—Milty. Sec.' —— writes me that the telegram was—'Secretary State *declines* to sanction your employ on Congo.—Milty. Sec.' That was odd. I had acted on the telegram I *received*, and sent letters and telegram, thinking it settled. In all this I was not moved, though it has cost me coins of the realm. . . . I have told —— that I will keep my promise to the king. . . . It is not for any great success on the Congo; it is not that I am wrapped up in it, but I have a nice house with garden and no worries in the horizon, and if by the keeping of my promise I would get a free and speedy passage to it (not by British India Co.), I would be very glad, and it seems that the Congo is the route which is quickest to it, if, as I think, I am so *called there*. Of course this will not be to your ideas, who have so many anchors out in your wife and chicks."—*Ibid.*

Poor fellow! the mistake in the telegram "decided" his fate: without it he might have been in Palestine still, and yet the "garden in the horizon" is reached, we may be sure, and he would "decline" to have it all set right by an earthly hand!

Few people know (though Mr. Barnes has called attention to it) that General Gordon was within an ace of losing his life on his way from Jaffa to England. He tried to make the passage to Port Said in a fishing-vessel; but they got into a furious gale, in which the vessel nearly foundered, and at the end of two days and nights, half full of water, she ran in under Mount Carmel, thus being to the north of their starting-point. A steamer, however, passing down the coast, picked Gordon up and took him on board. On his return to Europe, he went to Brussels, whence he writes on the 5th of January, 1884:

"The die is cast. I leave the army and go Congo, D.V., on 5th February. I am glad of it now, and will do my best. The king will pay the compensation for loss of my commission."—*Ibid.*

A few days afterwards we find him at his sister's house in Southampton. But his name now was on every tongue as *the* man whom the government should send to Khartoum. All hope of seeing friends—

indeed, every prospect of a few days' peace at Southampton—was denied him. The quiet crescent where Miss Gordon lives was alive with telegraph-boys; newspaper interviewers rushed down from London; Gordon was distracted!

> "My dear . . . Bothered to an infinite degree, I escape to Brussels *via* Ostend, Wednesday morning from Charing Cross. I cannot help it."—*Ibid.*

This was on the 13th of January last year.

In the mean time, among numerous others there was a telegram from Lord Wolseley, and in response to this he arrived in London on the 16th, and was closeted at the War Office with him for some hours. The ostensible object of the interview was the question of Gordon's retaining his rank in the army. He had, a few days before, arranged to sacrifice his commission rather than disappoint the king of the Belgians, much to the astonishment of the public, who saw no necessity for the step. However, the difficulty was got over. Lord Wolseley was the bearer of a message to this effect from an inner room, in which sat Lord Granville and Lord Hartington, and he also was empowered to say that regret was felt at the mistake in the telegram which had caused such trouble; but we suppose time was too precious for more. No courtesy, however, was omitted forty-eight hours afterwards, when —recalled suddenly from Belgium—he and his gallant companion, Colonel Stewart, were bowed by cabinet ministers into the express train, which took them the first stage of the long journey to Khartoum.

The history of the siege, we feel, has yet to be written. It is known that a large mass of information under Gordon's own hand has been saved from destruction, and it is not too much to hope that details of great importance may still be forthcoming from some of the Mahdi's prisoners. But the accumulation of evidence all tending to demonstrate how Gordon's last and fatal commission was doomed from the first to end in disaster, lies only too clear before the world.

The task set him to accomplish was in reality to win a race against time. For the Mahdi to stand still was impossible: his success impelled him, and it was just a question whether Gordon's powerful influence with the Soudanese would enable him to withdraw the garrison before the groundswell of the advancing gale reached Khartoum: he, for his part, measured time by minutes, as we have just seen.

How completely Lord Granville was mistaken, when, on the 4th of January, he peremptorily gave Cherif Pasha to understand that the Egyptian garrisons were to be withdrawn from the Soudan, a moment's reflection will suffice to show. It was not a simple question of relieving some of the interior tribes from the wretched incubus of the Egyptian occupation. Had it been so, the delight of the long-suffering would have been the best lever possible with which to hoist them out of the land. The Mahdi and his Arabs—as Gordon was careful to call them—were those with whom we really had to deal. The fall of Obeid had previously furnished Mohammed Ahmed with a larger quantity of war material than had ever been in such hands before. Armed with every appliance of warfare, more especially with an "Intelligence Department" in the most perfect working order, the slaughter of poor General Hicks's enormous rabble of thirst-maddened and quarreling soldiery was simply a matter of endurance upon the part of those who hacked them to pieces. The whole of the armament of this military expedition, together with artillerymen forced into service for the Krupp guns, added to the prestige and strength of the conqueror. That Gordon was horror-struck when he realized the immense significance of Hicks's defeat, we can easily imagine. He wrote as follows on entering Khartoum:

> "I think that with nations, as with us, in spiritual things there must be shedding of blood ere freedom comes; of this there has been much shed. Hicks had ten thousand men who marched out; not one escaped. All their bones whiten the plain near Obeid. He appears to have been betrayed by a tribe to go through this woody country. It is terrible to think of him wending his way into the lion's den, with all his movements known to his enemy, who, when he chose, shut his mouth on him."—"*Private Correspondence.*"

Again, later on:

> "KHARTOUM, March 8, 1884.
>
> "I am learning, or trying to learn, to submit my will to His, with the thought that He never promised us comfort or success in the things of *this* life. He promised us great tribulation here, and peace in Him; therefore He is still faithful; if things do not work out on this earth as we in our foolishness would have them, may He be glorified, and may His will be ours."—*Ibid.*

On March 2 he telegraphs that Khartoum "has passed out of my hands." He considers that an earnest of English interest in his behalf, even if it consisted only of a demonstration of two hundred men at Wadi Halfa, would be of use to him.

> "It is not the number but the prestige which I need; I am sure that the revolt will collapse if I can say that I have British troops at my back."—"*Egypt,*" No. 12, p. 136.

A golden opportunity was offered by Osman Digma's defeat on March 1, and there probably was not a man in our forces who would not have given a month's pay for a chance of pushing on to Berber. On the 12th of March it is evident that Gordon had not realized that he was to be deserted:

> "The rebels are four hours' distance on the Blue Nile. . . . All news confirms what I have already told you, viz., that we shall before long be blockaded. . . . In the event of sending an expedition to Berber, the greatest importance is in speed. . . . A small advance guard at Berber would keep the riparian tribes between this and Berber quiet, and would be an assurance to the populations of the towns."—"*Egypt*," No. 12, p. 165.

To this comes the comforting reply from Lord Granville through Sir E. Baring:

> "I have to state that Her Majesty's government are unable to authorize any advance of British troops in the direction of Berber until they have received further information with regard to the military condition of such an expedition, and are satisfied that it is necessary in order to insure the safety of General Gordon, and that it will be confined to that object."—*Ibid.*, p. 166.

The sickening attempt to wheedle Gordon into deserting the garrison is met by words that are not pleasant reading when we consider that they are slaps in the faces of those who are responsible for the upholding of the honor of our country:

> "Pray do not consider me in any way to advocate retention of the Soudan. I am quite averse to it: but you must see that you could not possibly recall me, nor could I possibly obey till the Cairo employés get out from all the places. I have named men to different places, thus involving them with Mahdi. How could I look the world in the face if I abandoned them and fled? As a gentleman, could you advise this course? It may have been a mistake to send me up, but, having been done, I have no option but to see evacuation through, for even if I was mean enough to so escape I have no power to do so. You can easily understand this,—would you do so?"—*Ibid.*, p. 156.

The dark background of vacillation and general mismanagement which throws into bold relief the heroic days of Khartoum's defense, seems to intensify as time goes on. The most valuable time was lost, and the dead silence which reigned over the space between us and Khartoum was never broken by a bugle-call nor the tramp of a single soldier. Gordon's life was sacrificed by the indecision and procrastination of Her Majesty's ministers, and his blood will, sooner or later, be required at their hands.

It is impossible to disguise from ourselves that Gordon's last days were engaged in fighting a fierce foe within, as well as the enemies that surrounded him without. We have indications of the struggle in his brief telegrams; and, if his journals are not "edited" down to the bare bone, we shall trace it still more plainly. To his self-sacrificing sanguine nature the withdrawal of the garrisons at the first blush seemed possible; as he approached, it looked less probable. He tried to quell a feeling which had never been absent entirely for years; it only wanted a waft or two of the old black wing of the spectre to force upon him the conviction once more that he was "a Gordon humbugged," a tool lifted off a shelf to serve an unworthy shift! And the spectre passed him and met him in Khartoum! Looking at the central figure, we see him dimly throughout those fiery twelve months,—all that he was known to be as a man, and surpassing himself as the military officer in organizing the defense. To his own branch of the service fresh laurels have come, and the Engineers, above all others, will keep his memory green.

When we consider that, save through the history of his deeds as recounted to us by strange means and roundabout ways, Gordon was to his countrymen almost a man unknown, it is remarkable to find the whole world stirred at his heroic end. If, as we have reason for believing, it is a personal grief to the most exalted personage, and the most English heart in the land, that Gordon had never been seen by her, it may be said that this grief is shared by all but a very few of the subjects.[3] Unquestionably Gordon's dread of notice was carried to an extreme: he would never admit that there was a certain stage when a man's name and fame might allowably be public property. It was a pain to him to feel that he might so descend from the obscurity he loved, as to be mentioned in newspapers; and we remember that one gallant officer positively offended him, because he took occasion to inform the public, years ago, that "Chinese Gordon had gone to Egypt as governor-general of the Soudan under Ismail." "I have nothing much in this world," he said; "surely I may have my own name left me as private property." But has any name in this century passed through so many tongues?

It is not altogether to be wondered at that the popular ideal will of necessity raise up a tall, powerful, military-looking officer, but it must be replaced by a comparatively small man of no great physique, somewhat gray before his time, and shy, not to say actually embarrassed, in society. And yet no one could be in his company for five minutes, when once the ice was broken, without longing that his vast talents and winning originality should be more generally available. Those who knew him have naturally been led to speak of the expression of Gordon's countenance. We have noticed before, that men whose duties enforced much solitude and isolation upon them soon come to have two very different aspects. The desert wanderings had impressed their lines upon Gordon's face; the countenance became set after years of introspection; and there was for the most part the worn look that had scanned so many thousands of miles of burning sands. But when the joy of a congenial argument, a ridiculous caricature, or an amusing story ironed the furrows out, there was no more brilliant or animated look, and the intense blue eyes—not unknown as a tribal feature along Deeside—seem to hold one under their wondrous spell.

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[3] It may not be out of place to mention that by far the best portrait of General Gordon, to our mind, is a large lithograph, published by Marlborough & Co., 52 Old Bailey, London, and within reach of all purses.

In some respects, and considering the times we live in, it is a happy sign to notice how the outspoken faithful utterances of Gordon's deeply religious spirit have won him the love and sympathy of millions. It is by instinct people feel that he was the most bitter enemy of cant. Before the word "Puritan" is connected with his name,—and we have noticed this tendency more than once,—it is right to protest that it can have no place with him. His travels afforded him unusual chances for studying many singular phases of religious life, and he always went about seeking good in every heart. The quest was generally successful. He would dwell with great earnestness on the filial piety of the Chinese, and assign a long existence to them as a nation (under the promise in the fifth commandment), for the reverence paid to parents by their children even under somewhat unusual circumstances. He had noticed grandfathers behaving in the most dutiful way to their still surviving parents, when all the obedience of childhood would be displayed. His long intercourse with Mohammedans, and his admiration for their scrupulous attention to the forms and fasts of Islam, armed him at times with weapons which he would use advantageously when he came across half-hearted professors of religion at home or abroad. When he entered Khartoum for the last time, he took the mosque out of the hands of an impostor, and insisted on the Moslem population going there to daily prayers. But it is not too much to say that, till within three years of his death,—partly owing to his wandering life, and partly to his seeking in vain to find any religious community endowed with such a spirit of self-sacrifice as his own,—he had held himself aloof from much that would, no doubt, have rendered him immense assistance. He would be a church to himself, instead of a member of the church. We find him in this frame of mind in 1877:

> "I detest Christmas and Easter, and never feel relieved till they are over. First, because there are two Sundays. Second, because every one thinks it right to put on different manners. Third, because it is a time of gorging and giving 'backsheesh' to every one. I am sure we are starved spiritually by our shepherds. I do not know one who feeds his people."—"*Colonel Gordon in Central Africa*," p. 295.

We could quote more to the same purpose; suffice it to say circumstances entirely altered all this, and before the end came, he was one of the most attached members of the Church of England. It was in Northamptonshire that an opportunity occurred for him to look into such books as are generally to be found on the shelves of a clergyman's library. For the first time, and by the help of such works as Harold Brown "On the Thirty-Nine Articles, Pearson "On the Creed," and Wordsworth's "Commentary on the Bible," he realized the beautiful system on which the Church is built: these books were his inseparable companions in the Holy Land. By his special wish some of his deepest "reflections" have been laid before the public by Prebendary Barnes, of Heavitree, Exeter. From Christmas Day, 1880, and onwards, till he left us in 1884, he was the most devout and thankful communicant. Writing from Chelsea to an old correspondent, on the 16th of February, 1881, he says,—

> "I have got rid of a great trouble through the Holy Communion, but though it is a great relief, I cannot get rid of the wish my leave was out. To say the least of it, it is a cramped-up world."—"*Private Correspondence.*"

And again, after trying to take up mission work in the East of London:

> "I have found it too expensive to go among the poor, they ruined me!"—*Ibid.*

Once more, he writes two months later:

> "Reveling in communions, Mr. Haskett Smith is a good preacher; I think more and more of the value of the Sacrament. It is decidedly *the* levée, and corresponds to those in Job when the sons of God came before Him. . . . My great trial is that I have ended my life, and anything you or any one else can write or say is utterly useless. The lesson I have to learn is *patient waiting*, and I accept it with the above knowledge and the desire to be at rest. I must say that the High Church party—putting aside their banners and vestments—are a truly working and spiritually-mouthed class; whether they act up to their lights I do not know. The three hours' meditations of to-day were very fine, and very earnest and spiritual, not sensational."—*Ibid.*

So we see that by this time—April, 1881—the old horror of the Church's seasons had vanished, and a happier state of mind had set in.

Whilst deploring the weakness of mind which could make such a simple habit as that of wearing a crucifix a dangerous inlet for superstitious reverence, he found comfort in the act himself, as he told a friend three days before his last departure from England. Who shall say that such a true servant did not derive singular strength by bearing about with him the cherished remembrance of his own great Master's sufferings for him?

In China he had seen the full horrors of the death which is imaged in the crucifix. In the Soudan, when he writhed under his own sufferings, mental and bodily, those scenes came back to him:

> "To die quickly would be to me nothing, but the long crucifixion, that a residence in these horrid countries entails, appals me. Yet I feel that if I could screw up my mind to it, I could cause the (slave) trade to cease, for its roots are in these countries. . . . Many will say it is a worthy cause to die in. I agree, if the death was speedy; but oh! it is a long and weary one, and for the moment I cannot face it."

Dull indeed must he be who cannot understand that the Africa of thirty years ago and the Africa of to-day are totally different. Held at arm's length, shut in on itself, it would appear as if the indifference of the Western world had been aroused of a sudden by the words once spoken at a crisis, and now repeated, "I know their sorrows." The same brutal disregard for human life, the same oppression which had its strong hold on the Nile more than three thousand years ago, seem to cling to the very soil to-day. Cairo and its pashas wrench the heart-strings of half Northern Africa. The slavers' hunting-grounds on the Bahr Gazelle are as much the scenes of torture and death at the hands of Egyptians as they were in the times of the Pharaohs. Gordon's place in history will be by Livingstone's side. Both lived and died in an endeavor to cope with this sorrow, and they have dragged the wrongs of heathendom into the light before Christendom. A beseeching voice asking for pity for these people comes from Ilala and now from Khartoum also: the fate of Africa hangs on the reply.

THE FRENCH RAILWAY CORPS.

BY CAPTAIN W. A. H. HARE, R.E., D.A.Q.M.G.

By a ministerial circular, published in the latter end of July, 1884, the Twentieth Battalion of French Engineers, quartered at Arras, was converted into a second battalion of railway workmen, or *ouvriers de chemins de fer,* and the French Railway Corps was thus increased to eight companies. General Campenon, who was war minister at the time, is thus to be congratulated by the French nation on remedying a want which was sure to produce dangerous results in case of war.

Colonel Hennebert, in the preface to his work "L'Europe sous les Armes," points out with perfect truth that "the great difference in the system of massing large armies nowadays and that formerly resorted to, is entirely owing to the use of railways, and that the existence of railways obviates the necessity for the lengthy preparations that were necessary in by-gone days before a blow could be struck. Railways enable armies to be rapidly changed from a peace to a war footing, and woe betide the army that is backward in this operation; it may be almost said its fate is sealed. This being a fact beyond dispute, there is again the enormous use of railways in rear of an army in the course of operations, admitting that the army has been enabled to change from a peace to a war footing, concentrate, and take the field without a hitch or check. The immense scale on which war can be carried out, and its wants supplied from home or other sources, is again entirely owing to the use of railways, and this is a second fact equally beyond argument."

But this work of supplying the wants of a huge army in the field requires, says Von Goltz, in his work "Das Volk in Waffen," "endless labor, a perfect knowledge of the work, and immense resource. Duties of the kind can only be expected from a disciplined body recruited and organized as a military force, and perfectly trained with anxious care beforehand in peace."

The question is a serious matter for a great military power, and certainly deserves the closest attention in France.

The railway transport in question may be divided into transport on the *near* and *far* sides of the base of operations. Now, the railway companies of the country concerned can always undertake the former;

they know their own lines perfectly, and have large quantities of rolling-stock and plenty of well-trained servants at their disposal. There is consequently no necessity whatever for a trained military corps to carry out this part of the work. It is on the *far* side of the base of operations that this is wanted. Here the conditions are very different. Movements by rail now take place on the very scene of the struggle, on the very battle-field itself it may almost be said, and are exposed to all the risks and chances of war. Men to carry out such work must be soldiers, and, what is more, strictly trained and disciplined as such. This necessitates a railway corps.

Going more closely into detail, the work required of a corps of this kind may be classed under two headings. Under the first the work would be on a small scale and practically confined to small detachments accompanying the cavalry scouting in front, with a view to rapidly repairing the lines that were found cut or destroyed by the enemy; but under the second the work would be on a much larger scale, and would mean completely restoring and getting into working order the destroyed or abandoned lines of the enemy, or even, in some cases, actually laying out and constructing certain lengths of new line, as was done, for instance, by the Germans in the last war before Metz.

Heavy work of this description requiring system and method would in France be intrusted to military railway commissions, called *Commissions Militaires de Chemin de Fer de Campagne,* and to this effect the Central Military Railway Direction, or *la Direction Centrale des Chemins de Fer de Campagne,* divides the railway system of the theatre of operations into distinct zones. Each of these zones would be allotted to a special railway commission, called in France a "*Commission Militaire,*" and in Germany, a "*Betriebsinspektion,*" or traffic inspection.

Both in the German and French regulations the functions of these commissions, from a technical point of view, are moreover distinctly laid down, and the two systems consequently agree on this point. They are intrusted in fact with the construction, repair, and maintenance of the lines, buildings, and works; the choice and working of stations to be used in connection with the military transport; and the working of the trains either regular or special. To be equal, then, to the task that the military situation may at any time impose on it, the military executive *personnel* of a field railway corps should comprise,—

1. Companies of artificers (*Compagnies de construction;* Ger., *Eisenbahnbau-Compagnien*), intended to rapidly repair lines destroyed by the enemy, lay new lines, and destroy lines abandoned. These would be always well to the front with the troops in the first line.

2. Traffic companies (*Compagnies d'exploitation;* Ger., *Eisenbahnbetriebs-Compagnien*), intended to work and keep in repair lines in the immediate vicinity and rear of the army.

3. Companies of workmen (*Compagnies d'ouvriers de chemins de fer;* Ger., *Eisenbahnarbeits-Compagnien*), intended to furnish trained men for loading and unloading trains either with warlike or other stores, as well as men to act as storemen, etc.

An army operating in the field must have then, beyond all doubt, a railway corps permanently organized as a military force, and trained uninterruptedly in peace time in the technical and other duties that would be expected of it in war. Nothing but this can insure the proper working of the railway transport in rear of a large army, and its importance cannot be overrated.

All authorities on military matters have come to the same conclusion, but unfortunately in France there has been so much to be done in the complete reconstruction of the army since the disasters of 1870–71, that the subject of a railway corps has not till recently received the attention it deserved. In fact, France has been a long way behind other nations in this important matter. While the French army could only show a railway corps of four companies, Russia had one of five battalions, and Austria-Hungary a railway regiment of two battalions, styled a "Railway and Telegraph Regiment" (*das Eisenbahn- und Telegraphen-Regiment*), and capable when mobilized of producing eight artificer and traffic companies. But the disadvantage on the French side was still more striking when we compared her modest display of four companies to the large and well-trained railway corps of the German empire, and this is a point which still requires a somewhat closer examination from a French point of view, for reasons to which we need not here allude.

The railway corps of the German empire consists of a Prussian regiment and a Bavarian company, the latter being precisely like a Prussian company in every respect.

The Prussian Railway Regiment (*das Eisenbahn-Regiment*) is organized in a regimental staff and two battalions of four companies each. A company in peace time consists of four officers, eighteen non-commissioned officers, and one hundred privates. The regiment is for excellent reasons, for all purposes of training, placed immediately under the general staff. It is only by being constantly in immediate contact with the best and most selected officers of the German army that the officers of the Railway Corps can be expected to know and learn what is required of them. They are thus able to know the slightest alteration taking place in German and foreign railway matters, as well as every change or innovation in foreign armies. They have, moreover, immediate access to men in high authority, and can thus at once make known their ideas in quarters where they can take effect without delay.

The *matériel* given to the Prussian Railway Regiment is very considerable, and is a striking contrast to the parsimony in the use and expediture of stores generally practiced in the German service, thus showing the great importance attached to the efficient training of this new branch of the army. The regiment, in fact, actually possesses and works by itself a line from Berlin to the artillery practice-ground near Lutterbach, some thirty English miles long. It has been given in addition a large practice-ground, with every facility for training recruits. Here the latter are taught laying sleepers, rails, and telegraph wires, destroying and repairing lines and engines, in fact, every kind of railway work, and bridges have been built to train men in the repair of broken arches, etc., and destroyed railway works of every kind.

The regiment has an ample supply of rolling-stock of engines, passenger carriages, goods vans, trucks, etc. There is thus every facility for training men to act as porters or unskilled workmen in the loading and unloading of warlike and other stores, and teaching non-commissioned officers and artificers engine-driving, the care and repair of engines, the duties of firemen, pointsmen, shunters, etc., and finally the duties of railway guards, or the management of trains and regulation of traffic.

The strength of the Railway Regiment, large as it is in peace, would be enormously increased were it mobilized for war. Before the second battalion was raised, Paris and Helldorf put the strength of the German Railway Corps, when mobilized for war, at eight companies of artificers, four traffic companies, and two companies of unskilled workmen (*Bau-Betriebs- und Arbeiter-Compagnien*). This has, of course, been very much added to by the creation of the second battalion in 1875, and we should not be much out if we reckoned on these numbers as now doubled, certainly as regards the traffic companies.

Sub-Lieutenant Naville, of the Swiss Engineers, in a report which he presented to the Swiss Federal Council in 1875, estimated the total strength of the German Railway Corps at some twenty thousand men, including men in the reserve and landwehr. It is a well-known fact that all men belonging to the two latter categories, and employed on railways or belonging to trades connected with the same, are borne on returns carefully checked, and in case of war would be at the disposal of the Railway Regiment.

A field equipment of tools, appliances, etc., and wheeled transport to take the road, should the work be off the line of railway, is kept in store in a large building on the practice-ground of the regiment. This building is divided into as many distinct stores as there are companies in the regiment.

Finally, directly the order to mobilize has been wired throughout the country, the large railway companies are bound to supply a train complete with engine (thirty-one carriages in all) to each company, for the purpose of conveying it with its *personnel* and *matériel* to the scene of operations.

Seeing the way in which the subject had been dealt with in the German, Russian, and Austrian armies, a French military man might well look with concern at the half-hearted way in which it had been treated in his own. In fact, until July, 1884, the French Railway Corps was confined to merely four companies, or one to each regiment of engineers. The peace strength of these companies was much the same as in the German service, that is to say, it was four officers, ten *sous-officiers*, twelve corporals, and one hundred privates.

For purposes of training, these companies were attached to the School of Military Engineering at Versailles, and for purposes of pay, rations, discipline, etc., they were attached to the First Regiment of Engineers quartered there.

The choice of Versailles as a training-station was a good one. Close to the war office and the offices of the great railway companies in Paris, the officers of the railway companies had every facility for improving their knowledge in their new duties and calling. The great practice-ground in the plain of Satory, together with the existence of a large railway station with numerous lines of railway, and containing a large amount of rolling-stock and stores of every kind, were again advantages of no mean kind.

The men then, who in 1873, 1874, and 1875 commenced a new era in the French military organization, were certainly right in choosing Satory as the training-place for the nucleus of the new French Railway Corps. Unfortunately, it was but *en embryo*, and nothing more, and it remained for those who came afterwards to develop this embryo and give it real life. The constant changes in the office of war minister, and other questions of military reorganization, considered for the time being of a more important and graver nature, were no doubt causes which detracted from this matter, until recently, the serious consideration it certainly deserved. Anyhow, it must be admitted the subject had certainly been treated in a feeble and half-hearted way.

The actual total number of men that the four French railway companies could have produced on mobilization was in fact a subject kept dark by the French war office authorities for reasons probably best known to themselves, but we may certainly assume that it was far short of the number the German Railway Corps could produce. The only increase in the cadres, in case of mobilization, provided for by the law of the 13th March, 1875, was an additional reserve sub-lieutenant, two sergeants, and four corporals to each company. As regards men, the only men allotted by the ministerial circulars were those who had actually served in the companies, or certain men of the engineers who had been annually allowed to go on renewable furlough (*en congé renouvelable*) to work on the railways, and lived in the *circonscription de réserve* of the company.

In fact, the inferiority of the French Railway Corps was so far admitted by the authorities that the six great French railway companies were called upon to furnish, in case of war, eight field sections of railway artificers, workmen, etc. (*sections techniques d'ouvriers de chemins de fer de campagne*). This was done, it is known, in conformity with Article 25 of the law of the 13th March, 1875, the regulations of the 23d December, 1876, and the decree of the 18th July, 1878. Each section was divided into three divisions for traffic, line, and rolling-stock and engines, respectively. The total number of men enrolled in each section amounts to one thousand one hundred and sixty-five, or four hundred and fifty-nine for traffic duties, four hundred and twenty-nine for work on the line, and two hundred and seventy-seven for work connected with rolling-stock, engines, and *matériel* generally.

The *personnel* of these sections are bound to wear a special uniform as soon as they enter on their functions, that is to say, directly the army has been concentrated, and, at first sight, the creation on the whole appears to be a good one. Besides, by the regulations of the 23d December, 1876, these men are not only liable to the punishments inflicted by the by-laws of the railway companies they belong to, but are, when the sections are formed for war, under military discipline with all its powers and penalties.

In practice, however, the power to inflict military disciplinary punishments would meet with so many restrictions, that the men of the eight sections would to all intents and purposes be practically exempt from military discipline. In fact, they would be under the *Commissions Militaires de Chemins de Fer* already alluded to, and would only be called upon to obey the military commandants of the places they happened to be stationed at. The power of punishment really would rest with the board of directors (*Conseil d'Administration*) of each company alone. The connecting link between these sections and the army in the field they are intended to serve would then be anything but strong when put to the test. It would, in fact, be found to be faulty in first principles.

Again, another important consideration. These sections will, until the day of mobilization comes, have existed entirely on paper. Now, the French say, "Promises on paper are too apt to be like the promises of a Gascon," in other words, empty.

From what has been said it may be inferred how vastly superior the German army has been until recently to the French on this particular point, and had the French authorities drawn comparisons with the Russian or Austrian armies, the state of affairs in their army would have appeared in no better light. The organization of the Railway Corps in these three countries was superior to the French in every way.

The French had no official manual or hand-book defining precisely the various duties of every military officer or *employé* engaged in railway transport work on the far side of the base of operations, as had the Germans or Austrians. They had no line of railway devoted to and exclusively worked by their Railway Corps, enabling officers and men by constant daily practice to acquire such practical knowledge in the working of trains as can only thus be acquired. In the French corps there was no rank of officer commanding a battalion to which the officers commanding companies could look forward to, thus stimulating their zeal, and producing senior officers of long practice and experience in the corps. And there were, again, very few non-commissioned officers and trained men in the reserve on which the companies could reckon, and a very poor show of supplementary formations to fall back on in case of mobilization. There were, as regards the latter point, technical sections, it is true, but these were imperfectly acquainted with the wants of combatants and the requirements of an army, and their military spirit might well be doubted. This was how matters stood in France till July last.

Now, if we consider for a single moment the enormous importance of the transport question of an army during active operations in the field, and the various difficulties in the way of a proper and efficient railway system, we can well imagine the feelings of a French military man when he compared his own feeble organization on the subject with the great resources in *personnel* and *matériel* of the German, Austrian, and Russian armies.

The conversion of the Twentieth Battalion of Engineers into a battalion of *ouvriers de chemins de fer* did not come a bit too soon. Some such step was urgently required, and it distinctly shows a move in the right direction. The French Railway Corps will now at any rate possess about as many units of mobilization as those of her neighbors, and it is to be hoped that in the course of time it will have the same resources and supplementary formations to fall back on as have the German and Austrian corps.

General Campenon was supposed to be in favor of handing over a distinct line of railway to be exclusively worked by the eight companies of the Railway Corps, as is the case in Prussia. The idea is an excellent one, and it would be a certain method of imparting to both officers and men such practical instruction as could not otherwise be learned. The "*Avenir Militaire*" took up the subject warmly, and proposed the line from Châlons-sur-Marne to Rheims, a length of some thirty-six English miles, this being a copy of the system adopted in Germany, and admitted on all points to be excellent.

There remains, however, one point in which the French Railway Corps is still inferior to the German or Austrian, and this requires remedy at no distant date. It should be formed into an independent regiment, with officers of the rank of *Chef de Bataillon*, lieutenant-colonel, and colonel, so that the service may become a special one with cadres of training and experience. It is necessary, in fact, that officers of the Railway Corps should constitute a body of officers on a solid formation, and they should therefore be given, in their own professional line, the prospect of promotion to the higher and more coveted ranks, as is done in other arms and branches of the service, and without which it is hopeless to expect that professional zeal which is a sure stimulant to efficiency.

The bad state of French finances, of course, is a consideration that cannot be ignored, and the French military authorities must not be in a hurry to ask for too much. The creation of the additional four companies is a step they are to be congratulated on, and the subject must, we suppose, be allowed to rest at this stage for a while.

DOES GERMANY NEED A NAVY?

BY KARL JACOB.

The clouded aspect of the political horizon, the concurrence of a number of questions calculated to excite the mutual jealousy and ill-will of powerful nations, questions which may at any moment involve the armies and navies of the world, have combined, supported by the more or less vigorous expression of public opinion, which is usually so little regarded by the present cabinet, to awaken the British government to the miserably deficient state of their first line of defense. The German nation, represented by a body of politicians and statesmen far more practical and far-sighted, are even now considering the efficiency of their second. For many reasons, it is argued, the fleet of the German empire is in the last degree inadequate to the present and future needs of the country. The colonial projects of her great chancellor, while they must, at the outset, incur the dislike, if not the hostility of the greatest maritime nation, will involve a navy adequate to protect them and the trade which Prince Bismarck seems to regard as the *raison d'être* rather than the consequence of colonization. The possession of colonies of whatever size, then, is incompatible with the existence of an insufficient naval force. If Germany needs colonies she must, and without doubt will, be prepared to protect them. In the case of Great Britain this obligation does not seem to hold good. Her colonial empire, it appears, would, in the event of a large European war, be left more or less to shift for itself; at the mercy of any other maritime power "unencumbered," as an influential section of the present ministry would say, by the adhesion of loyal colonial communities.

The uncertain state of European politics, however, has brought the question of naval efficiency even nearer home to the German people. Not only has their attention been drawn to the problematical defense of the colonial air-bubbles of her chancellor, but her power adequately to defend her own coasts has been the subject of no little controversy. As in England, so in Germany, the naval authorities, though convinced of the necessity of an ironclad fleet for any power that aspires to a maritime force, are undecided as to the superiority of a small number of large, or a large number of small, ironclads. German officialism hesitates to adopt either alternative. The nation, it is said, remains comparatively unrepresented in the naval world in consequence of a feeble vacillation and niggardly parsimony which has too probably been borrowed from this country. The supineness and indifference of their English *confrères* on whom (and not as in Germany on the War Office) depends the safety of an enormous empire, may well have set an example which the German admiralty have not been slow to follow. The fear of building a number of vessels whose practical value can only be decided by a naval action, will, it is said, leave the German empire without that maritime force which the extent of her commerce and the variety of her interests require. Though the German admiralty hesitate to pin their faith to either of the two methods of construction, they do not deny the absolute necessity of an efficient if not powerful fleet of ironclads. A memorial from the Imperial admiralty was, therefore, presented in its last session to the Reichstag, urging that, however great the importance of the torpedo for the purposes of coast defense, it must play henceforth in naval battles but a secondary part. In spite of the vast improvements in German torpedo-boats effected by the firm of Schichan, in Elbing, both as regards speed and seaworthiness, it is considered that even for coast defense neither the present nor any probable improvements in this class of vessel will enable such a power as Germany to dispense with a sea-going fleet of ironclads. Even the vast improvements in Italian torpedo-construction have not brought such a consummation within measurable distance.

The possibilities and impracticabilities of torpedo-warfare have received no little attention from the German naval authorities. Their capabilities of improvement, their strength and their weakness, their place, in fact, in the naval warfare of the future have been carefully studied, and as nearly projected as the many unknown conditions will warrant. If the torpedo-boat is to become independent of the coast defenses, whether the latter consist of ironclads or forts, or both combined, it must be able to keep the sea for a much longer period than has hitherto been compatible with effective use. To keep the sea for any considerable time involves, of course, a corresponding supply of coal; and this requirement will affect the construction, size, and speed of the boat. It means, too, a high degree of seaworthiness. Both these conditions must tend to diminish the all-important speed of the vessel.

The improvements in German torpedo-construction have hitherto been designed exclusively for the purposes of coast defense. In this direction, however, a considerable degree of proficiency has been arrived at. Stations have been built and projected throughout the German coasts of the North and Baltic Seas for the reception of torpedo-boats; while the harbor, coast, and river defenses, affording shelter in cases of need, are said to be in the highest state of efficiency. In order, however, to avail themselves of the protection afforded by shallows and other obstacles to larger craft, the draught of these boats has been made as light as possible, in consequence of which their utility on the high seas is of course limited in the narrowest possible manner.

Under the most favorable circumstances, it is argued that the operations of a German torpedo-flotilla against a fleet of ironclads must be circumscribed, and at best dangerous. In England, France, and Italy, as is held in German naval circles, the effects of repeated trials have been more satisfactory. The French operations and manœuvres with torpedo-boats, even in comparatively heavy seas, have been attended by vastly greater success than those of their German neighbors. This is ascribed to the fact that the manœuvres in German waters have been mainly confined to coast defense, and to short and rapid attacks on an enemy supposed to be cruising not far from the harbors and forts in which the torpedo-flotilla could in the last resort take refuge.

The absolute necessity of providing suitable torpedo-vessels for distant operations is earnestly insisted on by the *Deutsche Heeres-Zeitung*. That influential organ of German naval and military opinion recommends the construction of two distinct classes of torpedo-boats, one for the purposes of distant naval war, the other to be exclusively confined to the defense of the German coast line. But so long, it urges, as an absolutely necessary speed of from twenty to twenty-two knots involves an inability in torpedo-boats to keep the sea for any extended period without recoaling, so long can no maritime power dispense, in the present perfection of artillery practice, with an efficient and powerful ironclad fleet. In any war on the high seas only those torpedo-boats can be counted as effective which are completely independent. They must not depend on other vessels for their supply of coal.

What nation, then, needs a sea-going fleet? Apparently all that aspire to great political power; and that Germany belongs to this class can, in the opinion of the above-named periodical, scarcely be doubted. The absolute necessity of such a fleet was recognized when first the plans for the creation of a maritime force were submitted to the Imperial authorities. At that time the political power of Germany was not by far so great as it now is, while the English fleet stood then at the zenith of its power. "At that time, too," as the German journal remarks with forcible truth, and to English ears terrible plainness, "we did not know as we now do that the English fleet would not make the progress that her traditions would have led us to believe." The fact, too, that Germany might become, besides a great continental, a great colonial power was not even foreshadowed by the creators of the German navy. Notwithstanding this, however, the result of much deliberation was the creation of a by no means despicable fleet. If such a fleet were at that time deemed necessary to protect the interests of the German empire, how much more, runs the concensus of German opinion, is it needed now?

The year 1884 has been one of considerable activity in German naval circles. For the first time the armored corvettes built expressly for the defense of the coast were organized and assigned each to a particular district. These corvettes, like the gunboats, have been preserved in a most satisfactory condition of seaworthiness. They kept the high seas in the heaviest weather, and manœuvred so quickly and accurately that this class of vessel will doubtless form an important factor in the strength of the German sea-going fleet. The manœuvring squadrons had the benefit of the latest inventions; and their performances have fulfilled the high expectations of the naval authorities. The maritime operations of last year were mainly intended to forecast as much as possible the issue of a conflict between a fleet and a torpedo-flotilla. Different manœuvres, each lasting about two or three days, were instituted for this purpose; and it has been demonstrated to the satisfaction (or rather I should say to the dissatisfaction) of the authorities that the torpedo-boat is not a match in spite of all the appliances and inventions of the present, combined with the most skillful and determined management, for a fleet of ironclads.

Though notwithstanding this result the performances of the torpedo-flotillas were on the whole satisfactory, no real reliance can be placed on them for the purposes of warfare on the high seas. The maritime operations of last summer have thrown much light on questions which, though they can only be settled in actual naval action, can nevertheless be estimated by manœuvres whose similarity to real warfare has been made as great as possible. They have demonstrated the fact that an effective defense of the German coast without an ironclad fleet is an impossibility. The immeasurability and terrible uncertainty which the latest inventions in torpedo-construction have introduced into the science of naval war are not in the least denied or minimized; they can be met only by increased watchfulness and by the employment of the electric light.

Italy and France have unhesitatingly adopted the system of thick armor-plating. The German nation, however, are especially warned against the irresolution and parsimony on the part of the English government, which has enabled France to creep up to what has been called by the most competent naval authorities of the day as an equality with the British fleet; and to a probable superiority which the tardy decision of strengthening the English navy will scarcely avert.

The practical employment of torpedoes on the high seas has of course been subjected to no practical test. But the impenetrable smoke which must arise in a naval action may well afford opportunities for torpedo practice at least equal to those which are expected to occur during the defense of a coast line.

This consideration, of course, is the principal ground of the hesitation and slowness of construction common both to England and Germany. It is, of course, apparent to every admiralty that the existence of ironclads is indispensable to naval power. But the celerity with which an enormous, expensive, and densely-crowded ship might be blown to pieces by an insignificant torpedo-boat has raised the question whether it were not better to diminish as much as possible the size of the ironclad than to preserve the colossal monsters of to-day. Whether armor or shot, large or small ships, torpedo or electric light will eventually gain the upper hand in future maritime combats can only be decided by a real naval action. Only the uncertainty of the result of such an action keeps the representatives of powerful maritime nations in such constantly friendly relations.

Swift cruisers, too, can form no substitute for an efficient ironclad navy. The best or fastest cruiser will be at the mercy in a naval combat of a more heavily-armed and better armored ironclad. In the majority of cases, of course, a combat on such terms would be declined by the weaker vessel. "Swift cruisers," says the *Deutsche Heeres-Zeitung*, "will in the future be useful only as privateers; and the power that possesses the largest mercantile marine will have most to fear from such an enemy. That state will be, before all others, England. But the considerable German marine will need a corresponding number of swift cruisers to protect it from the attacks of hostile merchant ships. That this force exists we should not wish to affirm."

The question whether ships of the "Alabama" type could now do any serious injury to British commerce has been disputed by no less an authority than Captain Bullock, who was charged by the Confederate government with the equipment of these vessels. He affirms that the greater part of the havoc wrought by such ships was effected at the great junctions of maritime trade, in parts of the ocean corresponding to the Rugby and Crewe of railway traffic. A few powerful ironclads stationed at such points would completely paralyze the operations of the lighter vessels. The neglect of this precaution, however, gave a blow to the American navy from which it has not yet even begun to recover. The captures of the "Alabama," too, were made in great part under sail. If steam had been employed she would have been constantly compelled to recoal far from the scene of her depredations. While the same objection would apply to modern privateers of the same class, they would labor under the further disadvantage that the most valuable British cargoes are now confined to steamships, which are the rule instead of the exception. Into this question, however, it is not within the purview of the present article to enter.

Suffice to say, that in the opinion of a large majority of the German public a fleet is absolutely necessary for the protection of present and potential home and colonial interests, of the trade that is spontaneously to arise from Prince Bismarck's annexation of New Guinea, as for the safe-guarding of the German coasts from the ironclad cruisers of her powerful western neighbors.

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Army and Navy Quarterly."

THE
ARMY AND NAVY QUARTERLY.

VOL. I. OCTOBER, 1885. NO. 4.

ELECTRICITY AS APPLIED TO NAVAL PURPOSES.[1]

BY LIEUTENANT W. A. CHISHOLM-BATTEN, R.N.

I. Application for General Purposes.
II. Application for War Purposes.

THESE are in some cases mixed, and there is no sharply-defined line between them,—take electric lighting as an instance. The ordinary internal lighting of a ship is quite distinct in itself from search-lighting, though produced by much the same means. They have both grown independently; but in a ship of war, the great object should be to combine the two.

Electricity is a great power in skilled hands, and can be used with safety and certainty even by slightly trained men, if only enough care and thought be taken in designing electrical appliances to make their use easy and abuse difficult.

The applications of electricity on board ship are various, and differ greatly. Sometimes it is necessary to use the electric force in such a way that it has power to melt any metal, to produce an intense light rivaling that of the sun, to propel a vessel, or to give severe and even fatal shocks to those handling its mechanism. At other times it is so gently applied that although it acts through the human body, it cannot be felt by the most tender child; and at others, it is so exquisitely sensitive that it will carry faithfully the distinct tone of a certain voice, and indicate a change in its neighborhood so slight as the movement by inches of an ounce of lead.

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[1] Read before the Royal United Service Institution.

The two properties of the electric current which are generally made use of are, first, that of causing heat when a comparatively great resistance is placed in the circuit; and, secondly, that of giving magnetic properties to any conductor through which it passes.

An apology is due for going into matters so simple, but in case there may be some who may not be familiar with these points, they will be briefly explained.

Electricity for naval purposes is produced by what may be termed a generator, which is generally either a machine deriving its power from the burning of coal, or a battery deriving its power from the slow burning of zinc.

The next part of any electric appliance to be considered is the circuit, that is to say, a conductor, generally metal, which allows the current to circulate from the generator to the place of application, and back again. This is generally formed of copper or iron wire.

The part of the conductor or lead which goes from the generator to the place of application may be called the main, and the part which comes back may be called the return.

When the result desired is the developing of heat or light, a high resistance, that is a small conductor, or one of a comparatively badly conducting substance, is introduced in the circuit at the desired place.

For instance, if the electricity originally obtained by the burning of coal, and then carried in an accumulator, be allowed to pass by a main wire which must touch the accumulator, to an incandescent or glow-lamp and back by a return wire, heat and light are produced in the thread of carbon in the lamp, which has a high resistance.

Or again, if the electricity produced by the burning of zinc in a battery be allowed to pass through the main to a small wire and back again, sufficient heat is produced to fire a charge of gunpowder.

When the result required is an exertion of magnetic force, the simplest, or at any rate the most familiar, form is the electric bell. In a circuit from a battery which slowly burns zinc, a current passes round a coil of wire, causing it to act as a magnet and to attract a piece of iron which makes the clapper strike the bell.

Or again, if the current, originally obtained from the burning of coal, be allowed to pass by the main to a magnetic arrangement and back by the return, the result is magnetic action which causes motion, and is sufficient to drive a boat or any useful machine.

Thus much of the simple principles of electricity.

Electric Lighting.

The most important application of electricity for naval purposes is, perhaps, the lighting of ships.

Electric lighting is almost entirely carried out by an extension of the simple appliances which have been described. The current passes from the electric machine or generator along the main to the lamps and back by the return; that is to say, the illumination in a ship of war is carried out by a large number of glow-lamps—usually about three hundred—of about twenty candle-power, that is, twenty wax candles, eight to the pound. The electric machine is usually driven by a steam-engine.

The advantages claimed for the use of electric lighting on board ship are many of them applicable, as you will notice, to its use on shore.

1. It is cheaper than oil,—at any rate than the oils allowed to be used on board men-of-war, and still more so than candles, which have hitherto been the general illuminants.

2. There is far greater safety from fire, as there is no occasion for carrying matches about or lighted candles, which in spite of rigid rules are often used naked. This is hardly surprising when one hears of the trouble which has to be taken to avoid naked lights being used in mines; the use of electric lighting also does away with that incubator of fires,—the lamp-room.

3. It hardly heats the air, and does not foul it at all.

Many merchant steamers and some ships in the navy are thus lighted, the principal reason against its extended use in the latter being the fact that men-of-war pass much of their time without getting up steam, but in troop-ships it has been almost universally introduced.

Andrews & Co., of Glasgow, have just completed on board the "Etruria" a large installation which, in its proportions, surpasses anything that has hitherto been attempted in the application of electric light to steam-ships. The "Etruria" carries about eight hundred and fifty lights, and a brief description will no doubt be interesting. Swan glow-lamps are used, and of these ninety are distributed in the engine-room, stoke-holes, etc. One hundred and three lights altogether are used for lighting the main dining-saloon, eighty-four of which are suspended over the tables in three-light electroliers hanging from the ceiling. The remainder of the lamps are in small brackets and pendants so as to give light over the side seats. Above the saloon is the music-room, having seventeen lights round the walls and over the piano and organ. The smoking-room has also seventeen lamps. The remainder of the lamps are distributed about the ship, one hundred and seventy-two being in the state-rooms.

Besides the actual internal lighting of ships, electricity is used for the bow and mast-head lights. I understand that the Board of Trade does not object to the use of the electric light for ships' side lights, but it requires oil-lamps to be kept in reserve in case of failure. With regard to mast-head lights, however, the Board discourages the use of electricity, partly on the ground of its liability to get out of order in consequence of vibration, and partly in consequence of the brilliancy of the light tending to interfere with shore lights, and cause confusion. It is in fact not used for mast-head lights, and only in a few cases for side lights, and it has not been thought necessary to issue any general instructions, though the Board of Trade is now in communication with the Admiralty on the subject.

On this point there has been some discussion. The first lights used were very much brighter than the oil-lamps which they replaced, and caused mistakes from their being taken for light-houses, or from the distance of the ship using them being misjudged. There is, however, great advantage in their use, from such use securing certain knowledge that the lights are all right. This is effected by the current passing to the lamp through an indicator on the bridge, in view of the officer of the watch.

The ordinary lights carried by ships-of-war when cruising in company are now in some cases electric, and the electric light has been ingeniously adapted to signaling purposes.

One of the most complete arrangements got out by the well-known firm of Sautter Lemonier is as follows:

Two groups, of five glow-lamps each, are suspended at a certain distance above each other, and the current is allowed to pass to one or more of them by a key-board in the deck-house. In order to prevent mistakes, the signal is set before the current is allowed to pass to the required lamps, and this setting lights up a corresponding signal in front of the operator, thus: He wishes to show four lights, and puts four lamps in connection with a main switch. In doing so, he uncovers four little illuminated windows in front of him. Satisfied by the appearance of this signal, he switches on the current from the generator, confident that his signal will be correct. A switch is merely a means of connecting or disconnecting one conductor from another, as is also a firing key, which will be mentioned later on. Or the signaling may be done by hoisting the light and signaling with the key; or again by dipping the light in a bucket. There is also an application of the glow or incandescent lamp for the purpose of coaling or doing other work at night. In this case a group of about a dozen lamps are placed under a reflector which is triced up to the yard-arm, so as to light up the deck of the ship and the coal wharf or vessel alongside.

The glow-lamp is also useful for the diver, either in thick water or at night; but special precautions have to be taken to prevent the globe being broken by pressure, and for this purpose it is inclosed in a second thick glass globe.

The electricity for the lamp is either derived from above water through wires kept carefully dry, and not touching any metal, or it is in some cases provided by a battery carried by the diver with the lamp.

Messrs. Siebe & Gorman's lamp is of the latter kind. The lamp is mounted in a parabolic reflector fixed to the side of the battery-box. The battery will keep a constant light going for four to five hours.

We now come to a different form of illumination, called the arc light. In this arrangement, a suitable current of electricity is allowed to pass through two carbon rods in contact, and then they are slightly separated. The effect of this resistance or space introduced into the circuit by separating, is to produce a very brilliant light, proceeding partly from the heated carbon rods, and partly from a luminous arc between them.

This light is very intense, too much so for many purposes. The carbons burn away, so that some arrangement is necessary for bringing them within the proper distance for the arc, and for replacing them when entirely consumed.

This arc light has been used for internal lighting, mast-head lights, and coaling lights, but the necessity of having some apparatus for feeding the carbons and other causes have forced it to give way generally, for these purposes, to the simpler glow light.

For the search light, however, used for discovering torpedo-boats approaching a ship, bombarding forts, and so on, the arc light is a necessity, as great intensity is required. The search light is a warlike appliance, but had better be considered in connection with other uses of electric lighting. It is very useful for other purposes, such as clearing the anchor at night, and such peaceful, or at any rate unwarlike operations. When the arc is used for a search light, its rays are all collected by means of lenses or mirrors, and projected in one beam, so as to get the strongest possible light.

The difference in power is immense between the glow and arc lights in ordinary use at sea; the glow-lamp representing only a few candles, seldom more than twenty, but the arc as now used about twenty-five thousand, and a far more intense arc light has been produced on shore. A boat can be discovered by it at a great distance.

In the West Indies, in a fine clear atmosphere, a building has been picked out clearly enough to be aimed at with a gun, at a distance of two and a half miles, the light used being about eight thousand candles; but great difficulty was experienced in keeping the beam on the object, as one could not see any distance unless standing away from the light.

To obviate this, means have been devised for directing the beam by an observer at some distance from the lamp.

The search lights in general use are worked by a man who screws the carbons together as they burn away; this method, undoubtedly crude, has been adopted chiefly for simplicity's sake, but it is high time that a suitable automatic lamp—that is, one which is self-feeding—should be introduced, and that the direction of the beam should be in the hands of the observer, although he is necessarily at some distance from the light.

The electric lights belonging to the ships have been considerably used during the operations in Egypt; one was landed, generator and all, at Alexandria, and another at Suakim. The light was also much used at the latter place from on board, for discovering the approach of the enemy at night.

For signaling, the arc light has been used for many years, the process being to flash the beam up in the sky in longs and shorts, using the Morse or some similar code.

To show what may be done in this way, it may be mentioned that during some of the electric light night exercises carried out at Portsmouth from the Torpedo School, the flashes of a light of about twenty thousand candles were distinctly seen thirty-one miles from the ship, a low range of hills intervening; and a similar light was reported to be seen still farther when shown from a tower of the Philadelphia Exhibition last year.

Again, some ships being anchored in Ragusa and others in Gravesa, signaled to each other in spite of the hills between, by flashing an arc light up in the sky.

There is no difficulty in lighting up a building at two miles' distance with a twenty thousand candle light.

Electric Communications.

From signaling by the light at a distance, one passes naturally to other means of communication for which purpose electricity is more universally used than for any other.

Telegraphy, in the nature of things, is not in use much outside the ship, from the difficulties of bringing in the wires with a ship swinging round her anchor; but means have been devised for this useful object which are especially applicable to light-ships: telephones, and so on, can of course be used from a ship moored head and stern,—in fact, light is sometimes supplied in this way.

As regards electricity within the ship herself, the uses are manifold.

The ordinary electric bell I need hardly dwell upon, but the two appliances most especially required in men-of-war are first, a means of knowing the speed of the vessel at any time, and secondly, of telegraphing distances of the enemy ascertained in the tops, to the captain and gun-batteries.

I am not aware of any method, which is in very general use, for obtaining the first result. But there are numerous approaches to it.

There are many instruments which give the speed of the ship or engines for a greater or less period of time, but what is required in a man-of-war is to know the speed at any instant.

Various electric logs do the first; that is to say, the space passed over can be noted during any period, but the speed at a given instant is not shown. Even an instrument which showed at any instant the speed of the engines would be a useful improvement.

The principle of most electric logs is that the revolutions of the fan periodically close a circuit. When this is done, a dial hand moves on one division, usually a tenth of a mile. If, then, the electric log be joined up to a recorder in the captain's cabin, and another in the chart-house, and set at noon, both the captain and the officer of the watch can see at any time how far the ship has run since then, or since the last time the instrument was looked at.

The difficulties of a joint which shall connect two conductors, and yet be able to stand continually being revolved, appear to have been dealt with in an original manner in the "Dollond" log; the principle is protected by patent, and is applicable to the attachment of wires for signaling to light-ships or other vessels swinging round their anchors.

This log will be sufficient to give an idea of these instruments.

The log used in the navy for recording the distance passed over by a ship consists in a fan which is towed on the quarter of the ship, and which, as it revolves, shows the number of miles passed over on a dial plate attached. The disadvantage is that it has to be got on board in order to see how much distance has been run.

Other logs which are much used in mail steamers have a fan towing, but the recorder is on the taffrail, and is turned by the towing line.

The disadvantage is that the recorder can be in one place only, and only one recorder can be used.

It is claimed for the electric log that it is more trustworthy than the taffrail log, and more useful than either, in so far as one or more recorders can be placed in any required position. The advantage is obvious in any ship in cruising time; but in a ship of war in action its value is enormously increased, for it is easy to place telephones in connection at any required point in the pilot towers, at the Whitehead directors, gun directors, and gun-deck, for in firing a gun it is necessary to know speed, and still more necessary when firing a torpedo.

It indicates at once any mishap to the log, by fouling or carrying away.

It saves the labor, loss of time, and error of registration involved in hauling in the log, which can remain in the water, unless fouled, until entering port.

The instantaneous registration of the distance run between two bearings enables navigators to calculate with accuracy their position in reference to a light, headland, or other fixed object.

The indicator can be reset on board at any moment.

The addition of a small self-contained apparatus and a bell, which can be placed with the indicator or in any other part of the vessel, communicates by sound the regular working of the log, and enables the officer on watch to detect any irregularity and to take instantaneous bearings at given distances, without referring to the indicator or the log.

A distance indicator devised by Lieutenants Jackson and Anson, of the "Vernon," has undergone already a trial in the "Excellent" and "Vernon," and has been favorably reported on. The indicating hand is rotated in either direction, one step at a time. A spring brake prevents it from being thrown out of adjustment by the concussion of firing heavy guns. A bell is fitted in the receiver which rings each time a signal is completed. In the transmitter, a red disc shows when the circuit is completed, and the battery running on circuit. The instruments are carefully protected from wet; they will work in any position, and are entirely unaffected by damp and gun-fire; two wires are used with each circuit for connecting transmitter with receiver. The commutator, however, is of delicate construction, and the springs on the armatures require careful adjustment for efficient working with low battery power.

The great defect seems that there is no method of telling whether the two instruments, transmitter and receiver, are indicating the same signal, and if the battery be left on circuit for long it may fail to work the instrument.

The telephone is used from ship to shore, when ships are moored. In the "Vernon" one was used to the captain's house and found most useful. Through this telephone, some eight years ago, an officer recognized Professor Bell's voice, which he only knew from having heard him lecture in London, and he did not know the professor was in Portsmouth.

The application of the telephone to diving is most valuable, and in my experience was perhaps the means of saving a man's life. He was just able to say, "Pull me up," and was found quite insensible. It is strange to be capable of hearing a man below water, a mile away, as well as if he was at your side. Some difficulties were experienced at first, but have now been completely overcome. The same apparatus can be adapted for use on shore.

Telegraphy for parties landed, though not a usual equipment, is very useful, and I have seen shipmates with a small field telegraph consisting of a couple of sounders and reels of wire carried by men.

For automatic indicators, electricity may be used to indicate too great a rise of temperature in any compartment, to indicate if the ship is off her course—this is similar to an arrangement which will be described for steering a torpedo—or to indicate if the barometer falls beyond a certain point.

The application of electricity to testing the lightning conductors of ships is so simple that any trained seaman can obtain the resistance, without delicate instruments, with fair accuracy.

The propulsion and steering of boats by electricity is a subject which almost requires a separate paper to itself, and although sometimes used for war and sometimes for peace, the appliance is naturally similar whether a boat be carrying a torpedo or a policeman. Some particulars of two boats which could carry either may be interesting.

The "Electricity," which was fitted by the Electrical Power Storage Company two years ago, and which has run successfully many hundreds of miles, is twenty-five feet long.

The "Australia," built by the order of Messrs. Stephens, Smith & Company, is of the same length; batteries or boxes of stored electricity in the boat, work a screw propeller. The cost of the "Australia" is about one hundred and eighty pounds complete.

Each boat carries eight besides the coxswain. Speed about seven or eight knots.

The advantages of electric propulsion are,—

(1) Entire absence of noise in the boat; in fact, the only noise is that caused by the plash of the water against the boat's bows.

(2) No smoke to interfere with the man steering.

(3) No "flare up," which is practically impossible to prevent in very fast boats from the great draught up the funnel.

(4) No heat, which tells so much on the stokers in a torpedo-boat.

(5) Not so large a number of men required as in a steamboat.

The disadvantage of this form of motive power is of course the necessity of having means to recharge the cells again after use; but should this prove a successful experiment, regular charging stations could easily be provided for a boat to go alongside and have her cells charged, as, for instance, night patrol-boats could be charged alongside a jetty during the day for use at night. From the absence of heat this form of motive power would be most valuable in very hot climates.

The various appliances in a submarine cable-ship are special in their character, and are hardly to be considered generally naval.

One of these is a cable creeper which has a push in angle of the creep, so that if it catches a cable it rings a bell.

Now in the descriptions about to be given, reference will be often made to "testing." This testing is for the purpose of seeing whether the circuit, including the actual place of application, is in good order. The principal test is to see that the conductor and appliance have a complete circuit. To do this, a small current is allowed to pass round the circuit, too small to cause any appreciable heat, or to work the magnet, but large enough to affect an indicator or ring a bell, which only require a small current, thus showing all is correct. Should there be any break in the circuit, the little current cannot pass, and so cannot ring the bell or affect the indicator.

The current is supplied by a battery. A simple test-battery and indicator will easily show whether there is any break or not in a coil of wire, or any electric circuit.

ELECTRICITY APPLIED TO WAR PURPOSES.

Firing Guns.

We will now consider the applications of electricity to war purposes afloat, the first, the one considered most important, being firing guns.

The method of firing guns by electricity is simple.

The method of heating a wire by passing electricity through it has already been explained.

To fire a gun, the electric current is allowed to pass through a piece of fine wire surrounded by powder, and placed in the vent of the gun.

A firing key is used to allow the current to pass from the battery through the main wire to the little tube of powder in the gun, and then back by the return. If a very small current be sent through the circuit, it will not heat the resistance; and if it be made to ring a bell in the pilot-tower, the officer in charge knows that the circuit is all right.

Some of the advantages of firing guns by electricity are as follows:

When firing a broadside of guns together, if electricity be used, it is fired much more simultaneously than when using hand firing; and when firing single guns, the action is more instantaneous. This may be illustrated by a well-known machine. Any man trying to fire a gun at a certain time, or when certain objects are in a line, is only more or less successful in doing so,—generally less.

Another very important advantage of firing guns by electricity is that they can all be fired by an observer clear of the smoke of the gun-deck.

Again, the guns can be fired from a bullet-proof pilot-tower as the ship passes close by the enemy by any one person or the captain himself, the crew lying down or being placed out of the way. This is especially advantageous in ships which have their guns on the upper deck exposed to machine-gun fire.

Again, there are cases where the object cannot be seen from the gun, and electric firing provides an easy means of firing from aloft on the mast. Thus a ship in the Suez Canal fired at a train in motion, which was only visible from aloft, and hit it.

Again, the gun can be aimed at a fixed floating plank, and be arranged so as to fire when the plank is touched. In fact, it acts as a spring gun against torpedo-boats.

Electric firing for a single gun was recommended by the Chilian officers after the action in which the "Huascar" was taken, as the most likely to be effective.

It must be allowed that there is the disadvantage with electricity of the chance of damage being done to the circuit, but this would be shown by the bell in the pilot-tower. On the other hand, the advantage is that its use simply alters a heavy pull-off to a light one,—in fact, it may be called a hair-trigger.

Automatic Firing.—This is an arrangement for firing when the ship is rolling; for instance, the gun is required to be fired when the ship is upright, the circuit passes through a balance so arranged as only to connect the two parts of the circuit, that from the generator and that to the gun, when the ship is upright; so that directly the ship is in that position the guns are fired.

The method is claimed to have been brought to great perfection, but is not so simple as it looks.

Electricity may be used to light up the foresight at night. An appliance for this purpose has been invented by Captain McEvoy, the well-known torpedoist. It consists of a little battery and glow-lamp, which is screened except in the direction of the foresight. The electricity has to pass through a similar arrangement to that mentioned above for automatic firing, so that the lamp is only lit when required.

It is capable of a much more practical application than automatic firing, as a wide margin can be allowed to cover any error from the rolling of the ship.

It seems specially useful for resisting night torpedo attacks.

And now for torpedoes, which come next, at least, in importance.

Electricity is used for firing, propelling, and discharging torpedoes.

Just a word as to what torpedoes are. They are movable submarine charges of explosives, used offensively.

The name "torpedo" is, oddly enough, derived from the electric fish, but I do not suppose he who first applied the word ever thought that electricity would be so much used for firing these charges.

Firing Spar Torpedoes.

The spar torpedo is the simplest form, consisting of a charge at the end of a pole, which is put under an enemy's ship, and exploded.

For this form of torpedo electricity is now exclusively used, and the arrangement is usually as follows: To the battery a firing-key is attached by a wire. This key is joined to the main, so that on pressing the key the circuit is complete through a fuse which is similar in principle to the glow-lamp and which is in the torpedo, then back by the return to the battery,—an exactly similar plan to switching on lamps or firing guns.

There is also an arrangement by which the battery is joined to the main direct, and the main goes to an automatic firing-key in the head of the torpedo, which acts on striking, then by the fuse and return wire back to the battery.

A combination of these methods is generally used, though probably a separation of them would be better. The spar torpedo, though so simple, has at present the greatest score—at least half a dozen ships—against traveling torpedoes, one; and towing torpedoes none. The cases occurred in the American civil war, Russo-Turkish, and Franco-Chinese wars.

As in the case of the gun, a small current can be sent through the fuse, and can ring a bell or work an indicator so as to show the circuit is correct.

Firing Towing Torpedoes.

The next torpedo, which to a great extent owed its want of favor in our service to being introduced without electrical means of ignition, is the towing torpedo. This is, I believe, always fired by contact with the enemy's ship. When electricity is used, the circuit is from the battery to a contact piece in the torpedo, then to the fuse, and back by the return to the battery.

Though we are only concerned with electric firing, it should be explained that if any other method of exploding a torpedo is used, it is, after once being made dangerous, equally so to friend or foe.

With all electrical appliances the removal of the wires from connection with the battery renders the torpedo as harmless as a box of explosives can be.

Batteries are the usual generators for firing torpedoes. Sometimes, however, an exploder is used in which the power is derived from a man's muscular action.

Firing, Propelling, and Steering Fish Torpedoes.

Fish torpedoes claim our attention next, and there are many kinds of them; but those with which electricity is used are few; in them the force developed in some part of the circuit is made use of to produce motion or put the rudder one way or the other, or simply to fire.

When electricity is used for igniting the charge, all torpedoes are fired in a similar way to one of those described for the spar and towing torpedoes, namely, at will or by contact.

1. There are torpedoes which are propelled from, and controlled from their base, as the Sims, named "controlled torpedoes."

2. There are torpedoes which contain their own propelling power and are uncontrolled and unconnected with the position from which they are started; for instance, Paulson's. They have been called "auto-mobile" torpedoes.

3. There are others which contain their own propelling power but are connected with and controlled from their "base"; for instance, the Lay. They have been called locomotive.

First, those *driven* by electricity.

This is done either by electricity stored in accumulators and put in the torpedo, or through wires bringing the electricity from the base of operations.

In addition to fixed submarine mines, it has been considered necessary, in some cases, for coast defense to make use of a controlled motive torpedo, principally for attacking ships which attempt to clear a passage through the submarine defenses.

For this purpose a torpedo is required having the following properties:

1. Long range.
2. Handiness with the helm.
3. A heavy charge, so as to be dangerous even if stopped by a ship's net defense.
4. Security from enemy's fire.
5. Power of passing floating obstructions.
6. Not easily seen or stopped by enemy.
7. A motive power always ready, and not dangerous.
8. Constant speed to end of run.
9. Charge exploded at proper depth, for a charge on the surface is comparatively harmless.

The torpedoes of Ericsson, Lay, Howell, Whitehead, etc., are not considered by some good judges to fulfill these requirements as completely as that of Sims.

Common defects are, great complication, difficulty of preparing and keeping the torpedo ready, danger of explosion from the substance which drives it, great exposure to fire of enemy, want of speed, charge at the surface, etc.

The Whitehead is considered unsuitable on account of its comparatively short range, because it cannot be steered, and for other reasons.

The Sims torpedo is of the ordinary cigar or fish shape, and is driven by a current of electricity from a generator on shore, which passes through a wire laid out by the torpedo as it goes, and works a screw propeller. The torpedo can be steered and fired by electricity from the shore through the same cable. The torpedo is suspended a few feet below the surface from a float which is just awash. There are two different sizes,—the larger carrying two miles of wire and a charge of four hundred pounds of dynamite.

The two-mile torpedo is of copper so as not to rust, and is about twenty-eight feet long. The cable, which will just sink, is carried in a chamber to which the water is freely admitted, so that the buoyancy of the torpedo is but little increased as the cable is paid out. The charge is in the head. The wire chamber, which has a short tube underneath leading aft, through which the wire is paid out, is in the centre, and the driving and steering gear are in the after part of the torpedo. The steering is done by a separate current from a battery; the helm can only be put hard over either way, and when released is brought amidships by the action of the water.

The torpedo is suspended by strong steel frames about four feet under a boat-shaped copper float of about the same length as the torpedo, but whose bow is a few feet farther aft. A steel cutwater connects the bows, and, as it slopes downward and forward from the float, tends to force the torpedo under any boom or floating obstruction it may meet with.

The float is built in water-tight compartments, and filled with some buoyant substance, so that it is difficult to sink it. It carries the usual two upright rods,—one with a white, the other a red ball in the daytime and lamps at night. The rods are pivoted with counterweights so as to give and lie flat when passing under an obstruction, and to rise again when clear. The speed is said to be twelve knots.

The cable is of copper wire, and a small insulated wire in the heart of the main cable is used for steering.

The torpedo may of course easily be arranged to fire on contact if required. When it was tried by running at a spar, a spectator who was in a boat near did not see it, although watching for it, until it was within five hundred yards. The torpedo hit the spar in two successive trials within four feet of the point aimed at, and the marks on the spar were one and a half feet from each other.

The float has been riddled by bullets, and yet remained serviceable.

The great disadvantage of the torpedo is its want of speed. Some less clumsy method of maintaining it at its proper depth would, doubtless, very much increase the speed.

There is no doubt an advantage in controlled torpedoes which have their motive power on shore, and therefore have to carry less weight, but they can be only used from a special base.

Then those *steered* by electricity, though with some other driving power.

The Paulson Torpedo.—In this fish torpedo the steering is electrical. The motive power is supplied by liquefied carbonic acid. This torpedo is automatically steered in a direct or straight course by means of a mariner's compass, the needle of which, on any deviation of the torpedo from its course, makes contact with one or other of two insulated studs situated on either side of one end of the needle, and completes an electric circuit; a lever then causes one propeller to revolve at a quicker speed than the other, and thus steer the torpedo and bring it back to its set course. Supposing the torpedo to be approaching an ironclad, the mass of iron would cause the needle to make contact with one of the studs and the torpedo to be steered directly away from the ironclad, unless its path were due north and south (magnetic), and, to prevent this, a needle of a second compass in the head of the torpedo is arranged to short circuit the battery when attracted to one side or the other by the mass of iron.

The shell of the torpedo is made of compressed waterproof paper pulp, which is light and strong, has no effect on the compass-needles, and is not easily affected itself.

In order to render the weapon more effective, it may be controlled over part of its course by means of an electric cable paid out from the torpedo as it progresses, and by which the current from a battery on any shore or on a ship is conveyed to the two magnets so as to steer it on a desired course. When the whole of the cable is paid out, it is automatically detached, and the self-steering apparatus comes into operation.

The Lay Torpedo.—This well-known weapon is another example of the application of electricity to steering a torpedo. It is driven by other means, but lays out an insulated cable as it runs, and through this it is steered. It carries a very heavy charge, and it is usually run just on the surface. It has not made such rapid improvements as the Whitehead in point of speed. The usual rods or lights are used for directing the torpedo, and very good practice is said to have been made by it.

It has not been fortunate in war, for although there was a rumor that during the late war in South America a Chilian vessel was blown up by the Lay, I do not think that was the fact. There was an attempt to use it from a ship in the same war, but that method could hardly be expected to be successful.

Discharging Fish Torpedoes.

The simplest form is to ring an electric gong as a signal for the man standing by the torpedo to start it, for it must be understood that it is usually started from somewhere down below in a ship, and therefore it is necessary to have somebody up above to decide when it is to be sent on its journey. An improvement is, at the order "Ready," to full cock the discharging arrangement, the same movement connecting up an electric circuit which has only a break on deck, and which, when traversed by a current, puts in motion the machinery for discharging the torpedo.

Another and greater improvement is the torpedo tube, being fitted on the inside with a cartridge, which, when ignited, projects the torpedo.

The clutch, which keeps the torpedo in the tube, is arranged in such a way that when withdrawn it makes electric contact with an otherwise insulated binding screw on the right of the gun.

The torpedoes are arranged to be discharged by an officer who is in the pilot-tower. In this case the firing key is in the pilot-tower, between the battery and the place of application, and there is a break at the tube, so that there are two breaks in the circuit; when very nearly at the moment for firing, the word is passed down, when the lever is pulled by hand, freeing the torpedo and making contact at the gun. The torpedo is then fired by pressing the key in the chart-house.

The torpedo battery, which may be considered as a part of a defense system, has been devised to defend any channel left in mines for the passage of friendly ships.

It consists of a submarine framework, in which are fixed torpedo tubes, each holding a fish torpedo.

The observing station, which may be distant and quite invisible to an enemy, is connected to the battery by a wire which goes to an electric fuse.

A weight released by the explosion opens the valve of the engines and frees the torpedo from the tube.

Firing Submarine Mines.

Submarine mines are used by ships for the purpose of defending themselves, or any harbor in which they may be lying, or for the security of which they may be responsible, or for dropping behind them when retreating. They are charges of explosive, defensive and fixed, fired under water.

The difference between torpedoes and mines is this: If you want to be blown up, you must go to the mine; but if you don't want to be blown up, you must stop the torpedo coming to you.

The electrical methods of firing them are two: (1) firing at will; (2) firing by contact.

The observation method of firing at will may be briefly described as firing a submarine mine when the enemy is within range of the effect of its explosion.

There are two difficulties in carrying out this otherwise certain and simple plan. The enemy may not come within the range of the mine, and when he does you may not know he is there.

With the first difficulty we have nothing now to do.

The second must be considered, as on it depends the difference between the two electrical methods of firing mines.

The simplest, and in its usual form, perhaps the worst plan, is by the method of cross bearings.

To go back to our circuit.

There is a generator in this case, a battery that is on shore. The main wire goes from the battery to No. 1 observer, from whom the mine bears, say south, that is, the mine is directly south of him, then passes through his key; then goes to No. 2 observer, who has the mine, say, due east of him, and who also has a key. The main then goes on to a fuse in the mine, and the return takes the current back to the battery.

A word about return wires: the resistance of a conductor depends, other things being equal, on its size; the earth being large does not offer much resistance, and is often used as a return wire.

Now the circuit is not complete unless No. 1 and No. 2 both press their keys. A ship comes in. If ever she is south of No. 1 he presses his key. If ever she is east of No. 2 he presses his key; but the keys are never pressed together unless the ship is south of No. 1 and east of No. 2, that is, over the mine.

This system has lately been well described by an eye-witness, and I dare say you will understand his description better than mine.

"And now we are going to fire 'by observation.' There is a mine of eighteen pounds of gun-cotton down yonder, two feet under water, and that barrel there is an enemy's ironclad steaming up the harbor. But she may also run close by without actually touching it. This contingency has been provided for by putting the mine in electrical connection with two observing stations. Yonder is one perched up there some feet above the water. It is a wooden shed, constructed so as to be readily taken to pieces and put up again wherever it may be desired. In actual service, it would probably be half buried in the ground, and the front of it protected or rather concealed by a bank of turf. There are two of these observing stations at different points of the compass, but both on the same electric circuit. The observers within them are keeping the object-glasses of a couple of small telescopes following the ship there as it approaches the mine.

"These telescopes are so mounted, that until they both point exactly to the destructive area around the mine, the electric circuit by which it is to be automatically fired is incomplete. The enemy might pass too far from the explosive underneath the water to be much affected by it. In that case there would be no use in firing. The two telescopes looking from different points of view, would not at any instant converge their lines of sight at the mine, and there would always be a break in the circuit. The ship would go on her way. She is working straight for the mine, however. The gear of one telescope clicks into a sort of notch, and one break in the circuit is repaired. Click goes the other telescope. The circuit is complete; a tiny piece of platinum wire is instantly raised to a white heat inside the mine, and up goes the ship, a volume of water leaping into the air, some of it to the height of a church steeple, bearing with it fragments of the unlucky tub that has done duty for the foreign ironclad, which, under similar conditions, would not have gone up in the air probably, but would have had a hole knocked in her bottom which would speedily have sunk her."

Other methods are the camera obscura; the plane table by a telegraph from the second station; firing all the mines in the neighborhood of the ship, so that one of them must hit her, and so on.

The plane table is electrical. The telescope at one station works a ruler at the other, and when the observer finds this line and his cut over a mine, he fires.

"Observation" firing cannot be used at night or in a fog.

The other system, that of contact mines, is different. To start from the battery, the circuit goes to a contact-key in the torpedo, and on to the fuse; when the torpedo is struck, then back by the return.

A ship must actually hit this mine to set it off. The ship in fact blows herself up. She may pass close to any number of mines, but only a small charge is required.

The electrical disadvantage of this system is, that you cannot send a small current through for testing, unless a boat or a friendly ship bumps the mine for you. This has led to complicated additions. The simplest of these is a very high resistance which bridges over the break in the circuit, so you can always send a small testing current round the circuit; but when the mine is struck, enough current will go through the fuse to fire it.

The next addition was by means of a further appliance, so that the action of a ship striking the mine could be imitated.

This has been arranged by causing the magnetic effect of the current passing through the high resistance to attract the other side of the break in the circuit, so as to cut the high resistance out.

This is useful in two ways,—it gives a far more trustworthy test than a simple resistance, as it stands to reason that a delicate instrument which works all right in the mine shows no serious damage is done to it; and again, it is possible by this means to fire a mine as well as by the contact of an enemy's ship.

There is another means of testing an electric contact mine, viz., to have a telephone in the mine with a ball on the diaphragm, so that the motion of the mine in the water makes a noise in the telephone.

Electro-mechanical mines are those which carry their own battery inside. This saves wire, but if the mines are picked up, is extravagant in boats and men's lives.

In these mines means must be used to keep the mine safe while being laid down. This is effected in the simplest form by keeping the wires apart, and joining them at a safe distance when the mine is laid.

The dynamiters imitated a very common form which works by means of some chemical action. They put acid on blotting-paper, and got away while the acid was eating through it. This mine was without a circuit-closer.

These electro-mechanical mines were used for the defense of Suakim, and were very successful, or seemed so, for after the explosion of one mine, the night attacks, to guard against which they were laid, ceased for two months.

The Torpedo Detector.

This consists of a sinker, which is a heavy case, and a box, designed to be carried in a boat, from which the cable hangs. It can be so adjusted that no sound is heard in the receiver. If, now, the boat is pulled slowly through the water and the sinker is thus dragged along the bottom, no noise will be heard in the receiver unless the sinker comes into proximity with some mass of magnetic metal, such as a torpedo case. In this event, however, a humming noise will be heard in the receiver.

A slight and imperfect sketch has now been given of the appliances which come under the heading of this paper, and I think you will agree with me that no trouble, no care, no money is wasted, which is spent in teaching our men to make a proper use of electricity, which as a servant has been aptly compared, for ability and docility, to the slave of the lamp, but which as a master is always mysterious and sometimes terrible.

THE FUNCTIONS OF CAVALRY IN MODERN WAR.[1]

BY MAJOR GRAVES, TWENTIETH HUSSARS.

PART II.

(Concluded from page 344.)

THE points remaining for our consideration and discussion to-day are (1) *Cavalry dismounted service;* (2) Cavalry with an army in *retreat;* (3) Cavalry with an army in *pursuit;* and (4) some concluding remarks on formation, armament, and education.

First, then, with regard to *cavalry dismounted service.* A considerable amount of controversy has been raised on this subject, owing in part to the prominence lately given to the question as to whether or not a force of mounted marksmen should be raised and maintained in this country. It has been suggested that owing to the shortcomings of the cavalry dismounted service, a certain portion of the cavalry should be organized as corps of mounted marksmen, who would combine the best qualities of good infantry and of good cavalry. The predominant feature in this force would naturally be that of infantry, owing to their being marksmen.

Were this carried into effect it would reduce our cavalry proper by some two thousand men, all trained, and efficient with sword or lance and carbine. Further, it would take away from some twenty regiments something like twenty-five per cent. of their best men, and thus for a time render them inefficient in many respects; and to gain what? To gain what Jomini describes dragoons to be, "amphibious animals."

I consider our cavalry force to be too few by some thousands now, and this would only add to a confessedly existing evil were we to still further reduce it.

I consider that, owing to this numerical weakness from which we suffer, this is no time to attempt any such new experiment, which must be bought and paid for out of a very small and valuable capital, namely, our small force of cavalry. The interest on that capital is efficiency, and I think that this is no time to reduce that interest by adopting any such speculative scheme. We most likely, judging from the experience of the dragoons of by-gone days, should find our capital squandered, with the initial certainty of reducing the interest, as above, on some twenty regiments.

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[1] Read before the Royal United Service Institution.

Some cavalry officers have said to me, "Oh! if you are going in for making our men fight on foot, they will lose their characteristics as cavalry," etc. But let us consider this. We have our cavalry trooper. He is a trained soldier; he is efficient as a horseman, at drill, with the sword or lance, and has a fair idea as to what is required of him on outpost duty or reconnoissance. So far, good. We put into his hands a carbine, very effective up to five hundred and six hundred yards, and possibly up to one thousand. Will it mar his riding to encourage him to become a good shot? Will his becoming a good shot induce him to go to the left when he should go to the right? Will his liking for shooting, increased by efficiency, cause him to dismount with carbine when the "charge" is sounded? Certainly not. Well then, having trained him as above, and having developed his shooting powers, we find him in a position where his horse and lance or sword are useless to him, but where a carbine is the one thing needful. Having his carbine, and being able to shoot, is there anything contrary to cavalry economy in placing him in the best available position to use it with effect, namely, on foot? I know nothing, provided always that his instruction is based on the principle that the functional expression of cavalry is in the main founded on the united action of man and horse, and that the function of dismounted service is demanded of him for the fulfillment of a special purpose which could not be carried out on horseback. I decline therefore to admit that shooting on foot converts a cavalry man into an infantry man, as strongly as I deny that an infantry man mounted is a cavalry man. The trooper dismounted is a cavalry man still, and finds himself in that position under exceptional circumstances,—to shoot. The infantry man mounted is still an infantry man, and finds himself in that position for a special purpose,—to get to a certain place in much less time and with much less fatigue than if he went on foot. If we can train our mounted infantry up to a certain point of efficiency in outpost and reconnoissance work, I am sure that this efficiency would only add to their already proved usefulness. At the same time, I do not think it would be advisable to raise regiments or corps of mounted infantry; I think the necessities of the case would be met by having a certain number of men in each regiment taught to ride, and to do this I do not see why the depôt at Canterbury could not be utilized by the addition of a few horses and rough-riders; or why a riding depôt could not be formed at Aldershot with a certain number of horses and an instructing staff. The system of borrowing horses from cavalry regiments is certainly most annoying to commanding officers; but this point will be urged later on.

Part II., Section 23, of the cavalry regulations, is very clear and concise as to the object and rules to be kept in mind with reference to dismounted service, and alongside this section I would quote Von Schmidt; he says, " . . . The experience of the late campaign has proved irrefutably that it is indispensably necessary that cavalry should to a certain extent be able to fight on foot. . . . " Again, " . . . Through its ability in this respect it will under all circumstances gain enormously in independence and self-confidence as well as usefulness." Again, " When owing to circumstances, ground, or to enemy's occupation of localities and defiles, it is not possible for cavalry to attain its object on horseback; when it is very difficult to turn such places; *when nothing can be hoped for from mounted action, and there is no infantry on the spot, nothing remains to cavalry but to dismount.*" "*In acting thus we shall not become mere mounted infantry, which is the last thing we could wish to be; we have no desire to fulfill the rôle of infantry. . . .* In this way there will be an enormous development of that desire to take the initiative, that love of enterprise and longing for personal distinction which should animate us as cavalry soldiers, which alone we wish to be.

"It is not our place to stand fast under fire in positions under cover; our object must be to approach the enemy and dislodge him. To this end every cavalry soldier must be trained in the use of his carbine, and in fighting on foot in dispersed order; taking the fullest advantage of the ground and the cover it affords. . . . The following then are the things most required of us: More thorough training in the use of the carbine than hitherto; for this duty has been very much put in the background, instead of being developed like every other one for the highest instruction of the men. . . ." " An increased expenditure of time over this duty is not necessary, provided that the musketry is thoroughly carried out with real interest and intelligence. . . ." " More extended instruction . . . in taking full advantage of the accidents of ground." " We must make better use of peace time, and prepare ourselves more thoroughly and systematically."

Speaking of the regulations of Frederick the Great, and his constant use of dismounted cavalry, he says, " In this glorious period, however, cavalry lost nothing of its true spirit. They did not forget to charge with *les armes blanches*, although they had much more fighting on foot than nowadays."

May we not apply the greater part of this to ourselves? If all this is so necessary, and of such emphatic importance to the German cavalry, which outnumbers our own to an enormous extent, how much more important for us, the importance increasing in proportion to the smallness of our numbers?

It would be needless to quote the use made of dismounted service in the Franco-German war in detail, and I would simply refer to the valuable services of the mounted infantry in Africa and in Egypt from the very first. The American war furnishes us with many instances of the value of dismounted service, whatever the value of those performing it in other directions. The battle of Five Forks is a notable example of what may be effected by efficient dismounted service, when Sheridan's dismounted men dealt with the Confederate right, while the Fifth Infantry Corps turned their left, and acting thus together caused a total loss to the enemy of some thirteen thousand men, and won a battle which decided the war.

The action of Tamai affords an example in which cavalry is shown as coming up in the nick of time, dismounting, firing, and thus checking the enemy's advance, gave our infantry time to re-form. An eye-witness writes in speaking of the temporary retreat of the left brigade: "We came back about eight hundred yards. . . . By this time the fire of the First Brigade, on our right as well as front, and the cavalry on our left, held the Arabs. . . . It was some moments before the retreat could be checked, and then the check was in a great measure due to the action of the cavalry. When first the infantry were engaged, the cavalry withdrew to the rear, where they were hidden from the enemy by a fall in the ground. In the panic, the cavalry advanced at a trot, meaning to afford aid to the infantry by a charge. This happily was unnecessary. The enemy seeing a large body of cavalry bearing down upon them, hesitated; this gave time to the soldiers to listen to their officers, and to re-form. . . . the rebels soon began to come on again. . . . Here again the cavalry did good service, some of the squadrons dismounting and firing volleys at the rebels who were collecting in the rear and on the flanks." These examples, and a multitude of others that might be brought forward, prove conclusively the value of dismounted service. I am very glad that the question of the establishment of corps of mounted marksmen and the organization of mounted infantry has been raised, for I am confident that it will have the effect of indirectly increasing the efficiency of our cavalry dismounted service, which is the great desideratum, and also will give a stimulus to the training of at any rate a certain number of infantry in the use and care of the horse.

The second point for consideration is the functions of cavalry in relation to *an army in retreat.*

Jomini states, "Retreats are certainly the most difficult operations in war." He also says, "If the theory of war leaves any points unprovided for, that of retreats is certainly one of them." I will not therefore presume to enter into any theories as to the best methods of, times for, and order of retreats. It is sufficient to assume the fact of retreat of an army beaten in battle, but retreating in a fairly orderly manner, and that such retreat by an army of any magnitude should be conducted deliberately, "by short marches, with a well-arranged rear-guard of sufficient strength to hold the heads of the enemy's columns in check for several hours." The importance of keeping the touch between the various parts of the army retreating, and of the value of flankers, is shown by the mishaps that befell Napoleon during his retreat from Smolinsk, when the corps of his army retreated on the same road, but divided by a day's march, and having no means of information in the shape of flankers, the enemy cut in between the parts of his army, to his great loss, during three days at Krasnoi. Inasmuch as the chief function of cavalry in pursuit is to turn defeat into rout, so the chief function of the cavalry of the rear-guard of a beaten army is in combination with the other arms to prevent the defeat they have suffered being turned into a rout, and to cover the retreat of the army, so that order may be restored and confidence regained, with a view to a fresh struggle on arrival at a position suitable for the purpose.

A retreat under such circumstances is a very different matter from a movement to the rear of an army that has not been engaged, but is forced to move owing to the exigencies of supply, position, or political complications, etc. This is comparatively an easy matter; but, as Sir Edward Hamley says, "A beaten army is no longer in the hands of its general. It no longer responds to his appeal. The troops that have been driven from the field will be slow to form front for battle. Confusion, too, will be added to despondency, for regiments will be broken and mixed; artillery will be separated from its ammunition; supply-trains will be thrown into disorder, and the whole machine will be for the time disjointed." . . . "It is partly to provide for this that generals usually keep part of their reserves out of action." And Lord Wolseley writes that the rear-guards "should be formed at least from the freshest troops; their strength should be one-fourth to one-fifth of the whole force," so, I would add, as to put a screen of unbroken and fresh troops between the retreating and confused and their confident and pursuing enemy. With regard to the duties of such a rear-guard the same writer states, "The great art of rear-guards is that of being able constantly, without risk and with very little trouble, to force the enemy to deploy for attack, and then to get safely away yourself without any serious fighting; in other words, the rear-guard should, by frequent occupation of strong positions, be continuously threatening to fight, as it is by so doing that it best fulfills its purpose." Jomini lays down that "it is generally sufficient if the rear-guard keep the enemy at a distance of half a day's march from the main body."

Now, owing to the important issues depending on the right performance of the duties of thus screening a retreating army; to the intimate interdependence of the three arms upon one another in this work; to the constant necessity for showing a front, and in so doing the constant necessity for screening, covering, and supporting each other by the three arms, how absolutely necessary it is for the leader of the cavalry to know something of the functions and capabilities of the other arms, and to have a well-formed idea of what should be done, and how to do it!

He and his troops maintaining a position nearest the enemy (except at the actual moment of passing through a defile, when the infantry would remain in most instances in rear to cover their retreat by fire, the artillery having passed over first), should be animated with such a sense of responsibility for the safety of the army as to be willing to sacrifice themselves for the safety of that army and the honor of their country; he should be ever watchful to seize and hold with dismounted men such points and positions as will force the pursuers to deploy, and advance to the attack, at the same time showing necessary vigilance towards the flanks and any parallel roads thereon, so as by a good system of flanking patrols he may prevent the enemy outmarching him and cutting him and the remainder of rear-guard off from the main body. A knowledge of demolitions would here be useful in the destruction of bridges, in the obstruction of deep cuttings by cutting or blowing down trees, etc.

I will here mention as very useful for examinations in tactics, the lectures by Major Dyke, the garrison instructor, Eastern District. In that on rear-guards he states, "Military history abounds with instances of victories more or less thrown away owing to feeble pursuit, . . . in fact, vigorous immediate pursuit is rather the exception than otherwise." He instances that after the battle of Weissenburg, "on the evening of 4th August all contact with the foe was lost." Again, after Wörth, "the pursuit instituted by the cavalry was discontinued at the entrance to the difficult mountain passes, and thus all contact with the enemy had ceased to exist." In like manner, after Spicheren, night set in and the ground was unfavorable, and so pursuit ceased. Therefore the cavalry leader with the rear-guard of a retreating beaten army should be self-reliant and resourceful; should be bold yet cautious; and should do his utmost to wear out the patience of his pursuers, while carefully nursing his own force.

We now come to the functions of cavalry with an *army in pursuit.* We must remember that a most important element in the value of a victory is that the results should be brought to hand and made the most of. To this end a vigorous but not reckless pursuit is essential.

Where the victory has been decisive, the cavalry should be, if possible, pushed forward at once to prevent a rear-guard being formed, and to harass and rout the mixed crowds now in full retreat, to overtake them and hang on to them until they have thrown down their arms, and have practically dispersed. Should a rear-guard have been formed, the pursuing cavalry should keep the touch of it continually; when it presents a front, it should be thus held as long as possible, while a turning movement is attempted with a view to cutting it off. Its flanks should be continually threatened with this object in view. One of the best examples of such a pursuit is that afforded by Sheridan's pursuit of General Lee after the battle of Five Forks. Denison gives an excellent account of it. The pursuit lasted from the morning of April 3 until the whole of Lee's army surrendered at Appomattox Court-House on the 9th. The chief point of interest is to be found in the turning movement made between Dratonsville and Sailor's Creek. Lee's rear-guard turned there and stood firm, some ten thousand strong. Sheridan held them in front while he sent forward the leading division of his cavalry, who dismounting on their flank harassed and checked their supply-train and escort. Whilst this was going on, three other divisions passed along the rear of the dismounted men, crossed Sailor's Creek before Lee's rear-guard, took up a position on the high ground on the far side, and dismounting placed themselves across the path of the rear-guard, whom they received with such a murderous fire from their long-range repeating rifles that the result was that they captured six thousand prisoners, sixteen guns, and four hundred wagons. The same system of tactics brought about the surrender of the whole army as above.

History affords us but few such examples on this point. The Prussian pursuit after Waterloo was first-rate; and earlier the French pursuit of the Prussians after Jena was another noteworthy instance of the results of victory made good by a really vigorous pursuit.

I would close this part of the subject by referring to two other cases of such pursuits which stand out in bold relief. First: After the great battle of Arbela, Alexander with his cavalry pursued Darius. After leaving the battle-field he crossed the river Lycus, halted there to refresh men and horses until midnight, again started in pursuit, and reached Arbela the next day, distance seventy miles. Darius had gone on. Alexander followed him, until after three days and nights his infantry could no longer keep up; but knowing that Darius was bound to fight, he dismounted five hundred cavalry, and put on their horses five hundred of his best infantry, pushed on all night, and came up with the Persians in the morning, and routed them at once, whilst Bessus, having murdered Darius, escaped with only six hundred horse. The fruits of victory were not only gathered in by this splendid exploit, but the fate of one empire was sealed, and the position of the other made sure.

The second and last instance I would refer to is, of course, the pursuit after Tel-el-Kebir, and the marches on Zagazig and Cairo. The whole of the cavalry and mounted infantry was on the right, under Sir Drury Lowe; and while the infantry were assaulting the position, they made a turning movement against the enemy's left, and, working round, cut into the stream of Egyptian fugitives, causing them great loss. I understand that the Fourth Dragoon Guards and the Bengal Lancers reached the railway and canal in rear of the Egyptian position at 7.30 A.M.; they proceeded along the canal to the lock, and one Indian regiment struck off at once to Zagazig, where it arrived at about 4 P.M. the same day; and another Bengal regiment went on at once to Belbeis, followed shortly afterwards by mounted infantry, and later still by the Fourth Dragoon Guards. They bivouacked there that night, and starting again next morning about 4.30, reached Cairo about sunset, to find that the tidings of the victory had preceded them, and that their arrival so soon after had produced such an effect that the governor with a garrison of some ten thousand men surrendered to a handful of jaded and weary heroes, who would have found it almost impossible to have urged their horses into a gallop. Such is the force of moral effect when applied at the fitting opportunity.

The result of this victory, the further result of this close-following pursuit and march, so well conceived, so ably carried out, was that the enemy collapsed and the war was finished.

We have now concluded the consideration of what I must admit is a very imperfect consideration, as far as I am concerned in its setting forth, of the "Functions of Cavalry in Modern War."

Before, however, entering on the discussion, we might do well, I think, to look around and see what we can learn from our neighbors.

And first, as to the question of *armament*. As we are armed at present, our dragoons and hussars carry sword and carbine, and our lancers carry the lance in addition. Some of our Indian regiments have lance and sword in the front rank, and sword and carbine in the rear rank; officers, some non-commissioned officers, and trumpeters, carry sword and revolver.

In 1878 I was permitted to give a lecture in this theatre, which was published in pamphlet form, on "Military Equipment," and in it I advocated the plan of arming front ranks with lance and revolver, and the rear ranks with sword and carbine. I still believe that principle to be correct, but I fear that it would not be workable in our service, and I know that the general feeling is against it.

Nolan says, "All seem to forget that a lance is useless in a *mêlée*," as was demonstrated at Aliwal. Marshal Marmont says, "It would be better for cavalry to have both the lance and sabre, . . . the lance should be the principal weapon, the sabre an auxiliary arm." Jomini says, "In charges in line the lance is very useful; in *mêlées* the sabre is much better." De Brack also affirms this. I think therefore that the principle would find effectual practical expression if it were recognized as the general rule to support lancers with dragoons or hussars. We should then avoid such disasters as Aliwal, and should be in a fair way to realize the benefits obtained by this method at Meangunge. Touching the *revolver*. In November, 1864, a fight took place in Virginia between a squadron of Federal cavalry armed with the sabre, and a squadron of Mosby's armed with the revolver. The loss to the latter was one man killed and several wounded, and the loss to the Federals was twenty-four men killed, twelve wounded, and sixty-two prisoners; thirty-six killed and wounded out of one hundred. On another occasion, under similar circumstances, the sabres lost twenty-six killed and wounded, fifty-four prisoners, and eighty horses; the Confederates, who were armed with the revolver, *lost not a single man*. As before said, *we* only put revolvers into the hands of our officers, some non-commissioned officers, and the trumpeters; what is the state of things in Continental armies on this point?

I am indebted to the courtesy of an Italian staff officer, and to the military attachés of Austria, France, Germany, and Russia, at our court, for full information on this head.

The Italian officer informs me that up to two years ago their lancers had lance, sword, and revolver all through; now they have copied us, and have armed them with lance, sword, and carbine,—the revolver being distributed throughout their cavalry as with us exactly.

In the Austrian army, the lancers have front rank lances and revolvers, the rear rank carbines, all other cavalry twenty-eight revolvers per squadron.

In the French army, the whole of the cuirassiers have the revolver. The letter I received dated the 4th of June last states, "d'une manière générale" every man in the army who has not a gun has a revolver. Infantry, ordnance, and also in horse artillery, gunners and drivers, who have no carbine, have revolvers.

Lord Wolseley, who was in the chair on the occasion of my lecture, said on this point, "The next point is about revolvers; a good deal has been said upon that subject, and I fully concur in the remarks which have been made. I certainly agree with reference to the advisability of giving the revolver to artillerymen. At the present moment an artilleryman is really in a most defenseless condition: for if his battery is charged, unless he uses his handspike, he has actually nothing to defend himself with. *Every gunner should be furnished with a good revolver.*" I say the same; but I am not sure that I should give one to the driver, who would in most cases have enough to do in looking after his horses.

In the German army, the whole of the Prussian cuirassiers are armed with the revolver, and the corresponding heavy regiments of the other German states. In the other regiments, all officers and non-commissioned officers are thus armed.

The Russian military attaché in London writes me: "Cuirassiers and lancers have, in their front ranks lances, swords, and revolvers (six chambers); the rear rank of the cuirassiers carries sword and revolver; the rear rank of the lancers sabre and rifle." Now are America, Austria, France, Germany, and Russia all wrong in this matter? I do not invite discussion on my theory in this question; I respectfully invite discussion on the actual practice of these nations. Will wisdom die with us in this matter? No; but it looks as if our men without revolvers will die for want of wisdom. Let us look this matter fairly in the face. The weakest moment of cavalry, however armed, is immediately or shortly after the shock. But suppose one of our lancer regiments has charged a lancer regiment carrying six-barreled revolvers; in face of and compared with the revolver not only *in posse* but *in esse*, does not our weakness become weaker, and compared with our weakness, does not their weakness become strength? I would simply refer again to the two instances quoted from the American war, adding that they might be indefinitely multiplied.

I have been asked to touch upon the question of the use of machine-guns in relation to cavalry. I see Lord Charles Beresford has quoted the opinions of several officers of the different branches of the service.

The opinion of a colonel commanding an infantry regiment is, "To me it appears as if cavalry is the arm which will profit most by the introduction of machine-guns." He states, "It has practically always with it one hundred and fifty infantry, . . . and not a *single man has to dismount*." If this be so, then we should return our carbines into store and abolish musketry instruction. A colonel of artillery states, "A machine-gun to be of any use for this purpose must be able to manœuvre at the same pace as the battery which it supports." If this be so, it is a necessary sequence that it should also manœuvre at the same pace as the cavalry regiment to which it is proposed to attach two machine-guns permanently. Is this generally possible? Who is to command the battery of two guns? an artillery officer or a cavalry officer? In what relation is the officer commanding the cavalry regiment to stand towards the guns? I humbly think he will find plenty to do in giving practical expression to the functions of his cavalry proper. The same officer says further, "For horse and field-batteries the problem is more difficult. No carriage with small wheels can be relied on for transport purposes. . . . How can you transport them (machine-guns) so as to be suitable for rapid movements under service conditions?" If this problem is difficult of solution in relation to field artillery, it is more so in relation to cavalry.

A colonel of engineers says, "I cannot conceive their being permanently attached to cavalry or artillery without constantly hampering them, as it would only be on rare occasions they would be required." I quite coincide with this view so far as my present limited knowledge of the subject permits me to form a judgment.

As our pace is regulated by the capabilities of the slowest, I fear the machine-guns would be found a very slow horse. In any case, I think, as at present advised, their best place is with the horse artillery attached to the cavalry brigade, in which position they would, as occasions arise, render most valuable moral and actual help.

I trust a few remarks upon our tactical and administrative units and formation will not be considered out of place here. I am not a worshiper of everything foreign that differs from our own usage; but I confess I think we can learn something from the Germans here. We have four squadrons per regiment, and only three majors, the infantry having four. (I cannot see the justice of this, taking into account the interests of the senior captain of cavalry.) Owing to our squadrons being divided into two troops only, as compared with the four Zugs of the German, we lose the services of some officers from leading, they being relegated to the serre-file rank. I should like to see the tactical and administrative units reduced to the same denomination, the squadron, commanded by a major, with one captain and two subalterns under him. I should like to see the guide done away with, and the squadron divided into three divisions, the centre one under command of the captain, and the others led and commanded by the subalterns. The difference in handiness and mobility between three such divisions and two troops up to war strength should be obvious.

I have had to do with the instruction of a regiment composed of five squadrons of close on one hundred of all ranks in each, and can quite enter into the advantage it would be to have squadrons of three Zugs in each of some, sixteen front rank. We should gain in mobility and in the development of the powers of the younger officers.

It is in no spirit of carping criticism that I venture to suggest that the method adopted in the instruction of junior officers on joining is in very many cases very unsatisfactory, and does not attain the object which should be kept in mind by those who carry out their instruction. An officer is posted to a regiment, and finds himself on the barrack square among the recruits; he goes through the course of drill from the goose step up, together with the sword or lance and carbine drill, etc.; and as soon as he can perform these fairly well he is "dismissed." The same obtains with reference to his riding and musketry. *Seldom indeed is any account taken of his ability to impart to others that which he has learned.* As for meat, bread, hay, straw, and oats, he is supposed to know all about their quality, etc., by inspiration.

Surely this is not as it should be. No wonder then that many of these duties are irksome, and therefore improperly performed in many cases. No man can take a real pleasure or intelligent interest in doing, or attempting to do, that which, from ignorance and want of instruction, he can do only in a consciously imperfect manner.

We have at Aldershot a school for auxiliary cavalry, which, if developed, would prove of much more general use than at present. This school has to borrow from the cavalry regiments some twenty to twenty-five horses during certain periods of the instruction carried on there.

This is obviously a great tax upon the patience of the officers commanding the regiments thus depleted *pro tem.* They have also to lend a certain number of men who are required for foot-drill instruction, and who draw working pay for this duty. Now if this school were enlarged and had a riding-master (who would act as adjutant as well) attached, a couple of rough riders, forty horses (sound, but cast from regiments on account of age), and a deputy commandant, I think we could solve the difficulty of instructing the officers and staff sergeants of auxiliary cavalry, and teaching a certain number of infantry how to ride and groom their horses, besides affording young cavalry officers facilities for going through a course which, from personal experience, I can vouch would be very helpful to them in the matter of *imparting instruction*,—a point becoming of greatly increased importance under the new regulations for squadron instruction by officers. It might be replied that such an institution could not cover so much ground at one time. It would not be at all necessary, because there are certain months in the year during which it would be most unwise to press the attendance of auxiliary cavalry officers. This also holds good with reference to the sergeants of the permanent staff. Some of these very months fall at a time when it would be most convenient for infantry men to be attached for a course of riding, etc., namely, the furlough season, months when there is little done in the way of field days.

If the infantry are attached by twos and threes to cavalry regiments, they must necessarily fall to a greater or less extent into cavalry ways and ideas; but drilled together and working and living together as usual at such an establishment, the infantry spirit would be kept up.

Again, the troopers permanently posted from the cavalry with the horses would no doubt be men who have re-engaged for twenty-one years, and they would be available both for mounted and dismounted instruction drills. This method adopted, we should gain the advantage of one system of instruction for mounted infantry and the junior officers, as well as the auxiliary cavalry, and at a very small cost.

I cannot help thinking that our methods of instructing young officers are too cramped and too much confined to the subjective. It is very necessary under existing methods of war to obtain clear views as to the best way of acting and manœuvring in combination with the other arms. I need not say how little opportunity is afforded junior officers for this, except what they can pick up out of books or from the war game. This does not sufficiently *train the eye* to grasp the general idea of movements being executed by other arms of the service than our own. Would it not be a good way of spending a forenoon upon which there is no parade or other duty such as courts-martial, boards, etc., for a major to ride out with his squadron officers and watch the drill of an infantry regiment, or when possible a brigade, not to see how they worked so much as to discuss together the best means of supporting their advances or retirements, their various manœuvres and attack? As the movements are being executed, to guess their purport, and to suggest the best means of screening their movements from a supposed enemy, taking the character and features of the ground into consideration. To watch the movements of artillery in the same way, and to prospect the best methods and places for escorting and supporting them; then to get a distance from them and discuss the most favorable opportunities, means and direction for attacking them, taking into account the features of ground and the position of supposed support.

Colonel Chapman, military secretary to the commander-in-chief in India, delivered a lecture at the United Service Institution of India last May, his subject being "The Last Autumn Manœuvres of the German Army." He drew attention to the complete separation of the several arms of the service, and how they manœuvred in utter independence of each other. He says, "The cavalry acting under its own leader sought more to extend itself in isolated attacks on the enemy's cavalry, and instances of its dismounting and holding positions until the infantry came up were never noticed." Touching artillery he says, "Apparently there were no artillery tactics at all, and officers brought their batteries into action and opened fire without any study of the ground, and any particular object save that of firing upon the enemy." Cavalry did not care for the artillery, and the artillery and infantry did not work for each other.

I cannot understand the principle underlying the spirit of parsimony in a certain direction which limits the opportunities for the instruction of all ranks, from generals down, by means of autumn manœuvres. It is a principle of penny wise in times of peace, but must be pound and many pounds foolish in war. But then those who exercise this principle do not go to war; they stay at home and fight with the screw instead of the sword, drive their non-combatant teams with the quill, and harness them with red tape; and then when anything breaks down, throw themselves heartily into the, to them, congenial recreation of hunting the scapegoat.

A few words as to the rank and file of our cavalry service. I think it is a matter of sincere and unmixed congratulation that the reports from the various recruiting districts as to the class of men joining the cavalry were such, that the inspector-general of recruiting was able to state in his last annual return that they were without exception satisfactory. On reading this I immediately began to look up the question of education in this connection, and I am deeply indebted to the kindness and courtesy of General Sir Beauchamp Walker, to whom this Institution and the army at large owes so much in this matter, for information on this head, as also to Colonel Orr of the same department for the following tables, which show that the rate of progress in general education among the rank and file of our cavalry is an encouraging feature in our condition.

Percentage of Men (Non-Commissioned Officers and Men) in possession of Certificates of Education.

1873.		1881.	
1st class	0.75	1st class	1.0
2d "	8.3	2d "	15.31
3d "	11.35	3d "	12.94
4th "	9.3	4th "	30.89
Not certificated	70.30	Not certificated	40.37

The summary of appendix to General Order 121, 1st September, 1883, shows that in branches of the service of a strength of over one thousand the percentage of passes is as follows:

1. Foot Guards	97.72	4. Royal Engineers	90.60
2. Cavalry	91.48	5. Infantry (line)	89.33
3. Commissariat and Transport	90.99	6. Royal Artillery	87.65

The latter table places cavalry very high on the list in the matter of passes gained; the former proves that there is an eminently satisfactory rate of progress in mental capacity and intellectual culture; and in face of this growth of capacity and culture obtaining among the rank and file of our cavalry service, one hears with apprehension of the great difficulty met with in obtaining recruit officers for the cavalry; of special facilities being offered to candidates willing to accept commissions in the cavalry; of the necessity of modifying the terms of admission from being absolutely competitive to competitive combined with qualification. I welcome the modification, while I am bound to regret the necessity for it; but the necessity having arisen, I think the authorities are bound to grant us larger opportunities for instruction in those duties which lead us into combination with the other arms. As the hearing of the ear may bring the foot into readiness to move; as the seeing of the eye reveals the direction for the blow of the hand; as the foot may not say to the ear, "I have no need of thee;" and the hand without the guiding eye would strike wide of the mark, so cavalry, artillery, and infantry should have ample opportunities granted them of cultivating those inter-relations, for exercising those characteristic and individual functions which, carried out in union, weld eye, ear, hand, foot, and body into one corporate entity, form one harmonious whole, complete and perfect in all its parts.

To conclude, what does this marked intellectual and educational advance exhibited among the rank and file of our cavalry service demand of us regimental officers? It demands that which I humbly believe we, as a body, are seeking and striving after as never before, namely, a proportionate increase of capacity and knowledge for ourselves. We, who most of all exercise a direct personal influence on our men, should see to it that that influence is exercised for good; that we set them an example of diligent application, of scrupulous conscientiousness in the performance of our duty; that no detail of that duty is too petty or insignificant to be done carefully and well. Duty thus done becomes a pleasure; but duty done in a half-hearted and grudging spirit, as if it were a bore, makes that duty in time a bondage, and begets a spirit that soon infects those under our immediate influence to their grievous harm. On the other hand, as I trust will be admitted, the "Functions of Cavalry in Modern War" demand of officer and man increasing intelligence, self-reliance, and resource, increasing knowledge and efficiency for their effectual expression in action; thus that increasing knowledge, that resulting efficiency will necessarily add an unconscious dignity to the character and bearing of the individual, and will make him a valuable entity in that branch of our queen's service to which I deem it a high honor to belong.

LIST OF WORKS LIKELY TO BE USEFUL IN THE STUDY OF TACTICS.

General.

Hamley, Art of War.
Tactique des Trois Armes, Mazel.

Jomini.
Denison's History.
Clery, Minor Tactics.
Tactique de Combat, Brialmont.
Home.
Traité d'Art Militaire, Perizonius.
Modern Tactics (Wilkinson and Shaw).
Lectures, Dyke.

Cavalry.

Cavalry Regulations.
Von Schmidt, Instructions (for detailed instructions).
Conduct of a Contact Squadron, Bell.
Verdy du Vernois, Troop Leading.
Catechisms (Cavalry Regulations), Colonel B. Bell.

Artillery.

Field Artillery, Pratt, 1883.
Tactique de l'Artillerie, Von Schell.
Defense and Attack of Positions, Schaw.

Infantry.

Field Exercise Book.

THE LITERATURE OF THE THIRTY YEARS' WAR.

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"The History of Gustavus Adolphus," by Walter Harte, Stockdale's (the Third) Edition, London, 1807; "The History of Gustavus Adolphus," by B. Chapman, Vicar of Letherhead, London, 1856; "Gustaf Adolph, König von Schweden, und Seine Zeit," by A. F. Gfrörer, Dr. Onn Klopp's (the Fourth Edition), Stuttgart, 1863; "The History of Gustavus Adolphus," by John L. Stevens, recently United States Minister at Stockholm, New York and London, 1884; Geijer's "History of the Swedes" (comprising the first three volumes of the original down to the end of Christina's administration), translated by J. H. Turner, London, 1832 to 1836; "The Civil and Military History of Germany from the Landing of Gustavus to the Conclusion of the Treaty of Westphalia" (in reality of the whole Thirty Years' War), in three volumes or parts, by Frances Hare Naylor, London, 1816; "Geschichte des deutschen Reiches unter der Regierung Ferdinand III.," by M. Kock, Wien; "Eulogy of Leonard Torstenson, by H. R. M. Gustavus III.," Stockholm, 1787; "The Lives of the Warriors," by General the Hon. Sir Edward Cust, B.A., London, 1865–67; and at least two hundred other works or volumes in Latin, French, German, and English in the possession of the author.

THE following article is intended as a Review, but to partake at the same time of the nature of an Essay. The number of works of more or less value in regard to Gustavus Adolphus and the Thirty Years' War is very great; but in spite of the prominent names which appear as authors or inspirers, both the biography of Gustavus and the history of the Thirty Years' War has even yet to be written. From all the lives of the great king we do not learn the whole truth in regard to him. In some respects he is more a myth than the Washington of Weems. He was not a *saint* in the ideal sense of the word, but he was a MAN, and his motives, while they were subordinated to religious principle, were tinctured with selfishness and founded on policy. A successful leading politician in this country is said to have remarked that in a very large city he had found that virtue had a number of representatives, and vice had none; that he would unite the suffrages of vice on himself. He did so, was elected again and again, until all the virtues marshaled their champions under one leader, and then, and not until then, was he defeated. Again, it was said in an army that a number of especial classes rejoiced in more or less distinctive representatives, but that religion had none, and that whoever trained under that flag would succeed. A standard-bearer offered himself and did so. Thus it is: policy and interest walk hand in hand, and, as Lear said, the godlike and the devilish divide the empire of the *microcosm*, man.

Although Harte devoted heart and soul to his work on Gustavus, and accumulated an immense amount of information in regard to the king and the war under consideration, it is by no means satisfying any more than the most recent biography of Stevens, who from his position enjoyed advantages such as very few men in writing up a subject have possessed. The fact is that until the manuscript treasures at Skokloster are carefully arranged and indexed and published somewhat like our "Official Records,"—"War of the Rebellion,"—and are translated into a language familiar to the majority of historians, there is no use of expecting a true picture of the exterior actions and interior motives of this momentous period, or a clear revelation of the characters of the chief actors. As yet most writers have followed each other in the same rut. It is said that the two sides of the face of Gustavus III. were so dissimilar that a profile portrait from the left would never have been recognized as a likeness of the same person when painted from the right. Just so in regard to the prominent characters in the greatest religious war that was ever fought out between modern titular Christians. Nor are students anxious to arrive at the truth, more capable of doing so from pen-portraits than they are of judging of the real characters of the Joabs, Ahithophels, and Davids of the period from their actual portraits. Lying before me is Salmzon's exquisite series of likenesses of the leading men of the Thirty Years' War, published at Stockholm, within about thirty or forty years. Some of the finest faces belong to the weakest men, and to any but adepts in physiognomy the strongest men are by no means characterized by general features indicative of their strength. One man who looked what he was, "with a mind steeped in beer," was John George, Elector of Saxony. To a woman's fancy Gallas would certainly prove attractive. Banér has traits which recall those of Richelieu and Mazarin. Piccolomini shows himself completely: a bad, bold, Italian of the worst type. Horn, who had the character of being so humane that he disarmed war of its worst horrors, has a very harsh face; and Königsmark, whom the French represent as positively ugly, because he saw through their tricks, and would not submit to their imperiousness, has a portrait handsome enough to justify what they said of him, that he was a "woman's man," as well, as he really was a most enterprising soldier and sagacious leader. The finest head, however, grander even than that of Gustavus and Banér, who is said to have resembled his master closely, is that of Leonard Torstenson,—whose name, translated, signifies the Lion, strong, son of the (memorial) stone (or pillar) of the Thunder God (Thor),—in its blended grandeur of unmistakable goodness and greatness.

If called upon to recommend the best work in every respect for the period from the beginning of the war to the death of Gustavus, I should select, for whomsoever can read German, Gfrörer; as a general history, Naylor; as a military essay, Cust's "Lives of the Warriors;" and for the political or civil aspects, Gindely. For military details the last is almost worthless, and, as before remarked, there has not, as yet, been a real military history published. In his "*Geschichte des Kriegswesens*," von Brandt has furnished some exquisite episodes replete with the most valuable information; and Feil, in his "Die Schweden in Oesterreich," has presented facts, in detail, in regard to military operations within the Imperial Hereditary States in 1645 and 1646 which are astonishing in their revelations. Although I say it myself, and it may sound like egotism, I have never seen a book which contains such a mass of information (however undigested and shapelessly thrown together) as my life of Torstenson, which cost many years of the hardest labor and a large amount of money, willingly expended to obtain every authority accessible in any language open to me.

"Few modern nations can vie with the Swedes as historians; . . . in Sweden history don't stand on her dignity, pared down to barren facts, but is alike simple and amusing" [witness the series of historical novels of Topelius. Lagerbring in this respect resembles Topelius.] "Geyer [or Geijer], a greater genius far, . . . is the driest of the series. When selected by [his] government to write the History of Sweden," he recommended Afzelius as the best calculated to weave in interesting anecdotes and legends necessary to the full understanding of the matter. Fryxell is "quaint and legendary till the death of Erik XIV., when his style changes." Lastly we have Stjernholm,—"most painstaking writer of the century," of "unwearied industry." He can scarcely live, with his details, to bring his work down further than the rise of the Vasa dynasty,—all that is of interest to any but his own countrymen.

By the way as a parenthesis, there is a curious fact connected with Ten Broek's translation of Gindely's history, published by Putnam's Sons, which I once reviewed in *The United Service*. In his note to page 288, vol. ii., he alludes to the following passage in Gindely: "Für die unterhaltung der Reichs-armée wurden 120 Römer-monate bewilligt." Ten Broek observes, "This is the only passage of the work thus far the application of which I have not *supposed* that I understood." He translates it, "For the maintenance of the imperial army, 120 Roman months were granted." The real signification is that the Diet voted a contribution from the States of the Roman Empire (for which they were bound in carrying on a common war), equivalent to the aggregate of 120 monthly allowances, or six-tenths of the extreme amount for which they could be held liable, or the utmost ever granted,—*i.e.*, 200. "*Römer-monate*," is a technical term.

With these preliminary remarks what follows is a crystallized or perhaps, more properly speaking, a digested presentation or review of what occurred after Gustavus Adolphus, for astutely political and strictly military as well as actual religious motives, determined to take part in the great German war. "The pear had been maturing for years; it was now ripe and ready to fall;" the slightest breeze awakened by the pen or the sword was alone necessary to break it off. The Siege of Stralsund by Wallenstein precipitated events. The "pear" fell! Gustavus landed in Pomerania. It was the real beginning of the great end.

H. R. M. Oscar II. delivered an Address on the one hundred and fiftieth anniversary of the death of Charles XII., which proves that, in these times, kings are better educated and as intellectually able as any other class. He shows that however brilliant was the career of Charles, it was fatal to his country, but not fatal because Charles was "a madman," as he is generally styled, but because such a hero, king, soldier, and general, needed a kingdom more commensurate with his own greatness than Sweden.

Gustavus III., another king of Sweden, in a note to his Eulogy of Leonard Torstenson, written in 1787, makes a remark which shows that the Swedes were not always unanimous as to the permanent advantage of the military triumphs of Gustavus Adolphus, although the injurious effects were *remote* not *immediate*, as in the case of Charles XII.: "There was a time when, owing to particular reasons and purposes, it was attempted to dispute the great services Gustavus Adolphus rendered to the realm. *It was insisted upon that his glorious reign was more brilliant than advantageous* to the kingdom; *that it contributed more to the nation's honor than to its happiness*."

Horace Marryatt, in his "One Year in Sweden," reads to the point in this connection: "That contest lasted thirty years, though it destroyed the power of Romanism in the German Empire,—*half ruined* Sweden;" after Charles XII., "the curse and glory of Sweden," "A RUINED COUNTRY."

In both cases it was like an individual of great vitality and strength of constitution but of feeble physique, enabled by strong and quickly-repeated stimulants to perform great feats of strength,—terrible exhaustion necessarily followed. In the case of Sweden the stimulants were foreign triumphs, administered in heroic doses by boldest practitioners. The reign of Louis XIV. is nearly a parallel, and that of Napoleon. Both achieved marvelous military successes; both reigns ended in a prostration, which, as old Blücher feared for the cause of the Allies, would be the case,—*i.e.*, that

"Pens would lose by writing
What swords had won by fighting,"

or otherwise the *righteous* dismemberment of France in 1871 would have been more thoroughly executed, in one case one hundred and fifty, and in the other case fifty-six years before it did occur.

The deeper a student examines into the undeniable facts of history, the more it will become evident that there is absolutely nothing new in the world, and that what is accepted as new is nothing more than another form, or presentation, or application of the old—the *Vieux-Neuf* of Edouard Fournier—in some shape or another, justifying the declaration of Solomon, or of whoever was the author of Ecclesiastes, that wonderful production of the human intellect, that "there is nothing new under the sun." It almost would appear as if the adage is true, "The more folks learn, the less they know," or as Byron sung it, perhaps, better,—

"———Knowledge is not happiness, and science
But an exchange of ignorance for that
Which is another kind of ignorance;"

all culminating in the remark of the famous Prime Minister, Oxenstiern, to his son when starting out as representative at Osnabruck, "Go, see with what little sense the world is governed." One thing is unquestionable, the practical development of modern war dates further back than the seventeenth century, and is due not to one man nor two, but to many, and it would not be saying too much if it were asserted and maintained that war as well as religion owes its first real modern impulse to *printing*. Polybius hit the centre when he wrote that "Truth is to history what eyes are to animals. Tear out their eyes and they are useless. Even so take Truth from History and it is no longer of any use [or value]."[1] Before printing, except as copyists, writers drew upon their imaginations or their prejudices for their facts. Printing came to the rescue and just in time. All that the moderns knew, in 1500–1625, of real war was due to the Romans; that is to say, to their adaptativeness and adoption and conversion of the systems they encountered, so far improved and amalgamated, as they appear in the perfect praxis of the Legion. The Phalanx of the intellectual Greeks was a simple application to armed organizations of men of the laws of mass and momentum; the Legion of the less refined but more practical Romans was the perfect recognition of the power of momentum without the necessity of mass. It was the substitution of the manœuvring cannon for the ponderous and fixed artillery,—the ballista or battering-ram of the ancients,—the flexibility of intelligence and the education of individuals for the stiffness and unaccommodativeness of over-armed aggregated numbers. Printing diffused knowledge and reproduced the wisdom and works of antiquity, and Gustavus studied the classics, and in them found and from them derived his inspiration. His tactics were the reappearance of those of the Legion, destined to shatter the massed formations of his opponents as did the legions under T. Quinctius Flaminius, the phalanx of Philip V. of Macedon at Cynosciphalœ. Hallam, however he may be in less or greater degree correct in his "Europe during the Middle Ages," claims for the English Condottiere, Sir John Hawkwood, died A.D. 1394, the honor of being—

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[1] Any one who honestly desires to appreciate "what history can teach us," let him read the article by W. S. Lilly in the *Contemporary Review*, republished

> "The first distinguished commander who had appeared in Europe since the destruction of the Roman Empire. It would be absurd to suppose that any of the constituent elements of military genius, which nature furnishes to energetic characters, were wanting to the leaders of a barbarian or feudal army; untroubled perspicacity in confusion, firm decision, rapid execution, providence against attack, fertility of resource, and stratagem. These are in quality as much required from the chief of an Indian tribe, as from the accomplished commander. But we do not find them in any instance so consummated by habitual skill as to challenge the name of generalship. No one at least occurs to me previously to the middle of the fourteenth century to whom history has unequivocally assigned that character. It is very rarely that we find even the order of battles specially noticed. The monks, indeed, our only chroniclers, were poor judges of martial excellence; yet, as war is the main topic of all annals, we could hardly remain ignorant of any distinguished skill in its operations. This neglect of military science certainly did not proceed from any predilection for the arts of peace. It arose out of the general manners of society, and out of the nature and composition of armies in the Middle Ages. The insubordinate spirit of feudal tenants, and the emulous equality of chivalry, were alike hostile to that gradation of rank, that punctual observance of irk-

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in *Littell's Living Age*, No. 2152, 19th September, 1885, and reflect upon the influence of a great man upon the world's progress,—an influence which is due to the direct action of the Infinite upon the Finite, through the inspiration of genius, the individual, the Man of and for the Time upon Men.

some duties, that prompt obedience to a supreme command, through which a single soul is infused into the active mass, and the rays of individual merit converge to the head of the general. In the fourteenth century, we begin to perceive something of a more scientific character in military proceedings, and historians for the first time discover that success does not entirely depend upon intrepidity and physical prowess. The victory of Muhldorf over the Austrian princes in 1822, that decided a civil war in the empire, is ascribed to the ability of the Bavarian commander Schwepperman, [who] is called by a contemporary writer Struvius, 'CLARUS MILITARA SCIENTIA VIR.' "

Many distinguished officers were joined in the school of Edward III. Yet their excellencies were perhaps rather those of active partisans than of experienced generals. Their successes are still due rather to daring enthusiasm than to wary and calculating combination. Like inexpert chess-players, they surprise us by happy sallies against rule, or display their talents in rescuing themselves from the consequences of their own mistakes. Thus the admirable arrangements of the Black Prince at Poitiers hardly redeem the temerity which placed him in a situation where the egregious folly of his adversary alone could have permitted him to triumph [Lee and "Stonewall" Jackson are most apposite examples of these remarks in the Pope campaign]. *Hawkwood, therefore, appears to me the first real general of modern times*,—the earliest master, however imperfect, in the science of [Maurice of Nassau, Gustavus Adolphus, Banér, Torstenson, Mercy] Turenne and Wellington. Every contemporary Italian historian speaks with admiration of his skillful tactics in battles, his stratagems, his well-conducted retreats. Praise of this description, as I have observed, is hardly bestowed—certainly not so continually—on any former captain. Hawkwood was not only the greatest but the last of the foreign condottiere, or captains of mercenary bands."

It is useless to enter into an argument as to who did truly give the first impulse to systematized modern war; but it is worth showing, and susceptible of proof, that on the field of battle in the application of the "Three arms combined," Gustavus Adolphus was the MAN and HIS Leipsic, in 1631, the model. Torstenson's Leipsic, in 1642, was finer as an exemplar of simple direction and fighting; but the Leipsic of Gustavus was equivalent to the quiet daring of Franklin when he elicited the electric spark from the kite-string and demonstrated the feasibility of the application to buildings, of conductors. Gustavus in one sense as Franklin in another *eripuit fulmen.*

This flexibility, this individualization of force, is more and more manifested ever since in the less and less rigid tactics of each succeeding war, due as much to the dissemination of intelligence by *printing* as to the invention of more and more destructive firearms and their accumulation on the battle-field; of which the enormous susceptibilities were discerned by Gustavus Adolphus or by Torstenson, his famous chief of artillery; which of the two was the man who now can see or determine.

The Thirty Years' War constituted one of the decisive periods in the great process of human development and the liberation of Thought from the trammels of priestcraft and superstition. Without it, Thought would not now be *Free.* What is more, this contest was only a critical crisis in a conflict which may be said to have had a prelude in the struggle of the Seven United States of Holland for their emancipation from the yoke of Spain, and it was the latent continuing virus of the disease which required so much firing and blood-letting,—a virus manifested even as late as in the Franco-German struggle of 1870–71, which developed a new Empire and Emperor in Germany,—both firm in the belief and relief which the principal factors adverse to freedom of soul and body strove to crush throughout the Thirty Years' War. The most dangerous enemies to Human Progress in Europe were the Papacy and the House of Hapsburg, and their power was not thoroughly broken until Sadowa, in 1866. Claiming to be German the Austrians were the direst foes to Germany and to human freedom. They were the sworn tormentors and executioners of a church, which, if triumphant, would have plunged humanity back into a condition analogous to that of the "Dark Ages," and victorious, they would have crippled Mind for centuries. Ferdinand II., who made the Thirty Years' War, expressed as to will and wish exactly the idea of Tacitus: "They make a desert and they call it peace." Such may not have been his intention, as regarded a desert, for a waste cannot pay taxes or tithes, but such would have been the inevitable result had success crowned his resolve. Little did he think that when his organized or "disciplined savages," wasted the Mark of Brandenburg, that he was only preparing the way for the Rise of a new authority in Germany, which should place its heel, within about two centuries, upon the very head of his successors. Max Nordau, in his awful work, "The Conventional Lies of Civilization," prohibited in Europe, which has passed through seven editions in seven months in this country—in the fearful aggressive of his chapter entitled "The Lie of a Monarchy and an Aristocracy," is nevertheless compelled to admit that the Prussian Dynasty, "The Hohenzollerns of Germany, have at least a clean record of which they need not be ashamed." Frederick the Great, one of the greatest kings who ever simultaneously grasped the sceptre of a despotic monarch and the sword of a great soldier and general—one of these Hohenzollerns—within one century after the close of the Thirty Years' War, inflicted a deadly wound upon the Hapsburg power which has never closed and is still bleeding. Thence its life-blood has been ebbing slowly away, until now the third successor of Frederick is Emperor of Germany, and the Austrian

Imperialty, once the German Empire, is so little German that it is compelled to move in accordance with the influence and direction of other races upon which it formerly looked down as the master upon the serf.

Whatever skeptics, or worse, may say, philosophical and critical history proves indisputably that as the Moslem says, "There is no God but God," and God[2] "the Most High, ruleth in the kingdoms of men, and giveth it to whomsoever He will, and setteth over it the basest of men,—doeth according to His will in the army of Heaven, and among the inhabitants of the earth; and none can stay His hand, or say unto Him, 'What doest Thou?'"

Whether this Rule is applied through direct interventions or by inevitable laws; by immediate miraculous operations or fixed decree, has ever been a disputed point, and cannot be settled even through comparative citations from the Holy Scriptures. The weight of the argument lies in the scale of predetermined regulation, which leaves no fissure or hiatus for the voluntary action of mortals. To this is conjoined an intimate relation not only between the *microcosm* (man) and the *macrocosm* (universe), in cause and effect subordinate to law, and close affinity, step by step, grade by grade, from the lowest order of creation,—through the animal culminating in the highest order of men,—to the lights which burn by myriads in the measureless expanse of ether, as Pope rhymed,

> "So, from the first, eternal order ran,
> And creature linked to creature, man to man."

According to Fraunce:

> "Man is all symmetry,
> Full of proportions, one limb to another,
> *And all the world besides.*
> Each part may call the farthest brother.
> For head with foot hath private amity,
> *And both with both moon and tides.*

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[2] The Buddhists seem to demonstrate this in *their* universal prayer, "*Om mane padmi Oum*, Oh God, the jewel [only Supreme] in the Lotus, Amen!" and the Zoroastrians in theirs, "the purest and noblest religion of antiquity," recognized a One Almighty Supreme over Ormuzd, the principle of good, and Ahriman, the representative of evil—ONE WHOLE.

> ——"Joy above the name of pleasure,
> Deep self-possession, an intense repose. . . .
> No other than as Eastern sages paint,
> The God [OM] who floats upon a Lotos leaf;
> Dreams for a thousand ages, then awaking,
> Creates a world, and, smiling at the bubble,
> Relapses into bliss."—COLERIDGE.

"Nothing hath got so far,
But man hath caught and kept it as his prey.
His eyes dismount the highest star,
He is, in little, all the sphere.
Herbs cure our flesh because that they
Find their acquaintance there."

This was exactly the idea of the great Paracelsus, so abused by empirics, pedants, and people unable to reach the height of his genius understand him.

Wallenstein, whose horoscope (talisman [or astrological amulet]) is still preserved in the "Treasury" "Imperial Burg," at Vienna, stands by no means alone in his firm faith in the influence upon, and revelation of, the stars as regards the fortunes of men. The horoscopes of Gustavus, and of Pappenheim, and of Christian IV., made in accordance with the stellar conjunctions at their birth, were strangely fulfilled; that of the first exactly. The appearance of comets, "importing change," has always been regarded as ominous, and no one who beheld it can forget the huge meteor which passed over our country before the Slaveholders' Rebellion, in 1860, first separated into two with a mighty explosion, sailed on portentously, and, thus divided, across the arch of heaven and, then, became reunited into one orb before it disappeared; nor that which in the Northwestern heavens shone like a vast sword dripping blood, in 1863. Examples might be multiplied, but to whoever disbelieves in these appearances there is no need to say more or enter into further proofs or even more extraordinary examples of cause and effect or influence.

It is very doubtful if any of the leading men of the time were not more or less superstitious. Among the Positivists it has been asserted by his friends and admirers and by historians that "Banér was elevated far above fear and *credulity*." Above fear unquestionably, yes; but whether he was superior to the superstitions of his time is not so certain, especially if Parival, who published in 1656, is correct in his "History of this Iron Age," which comprises one of the most reliable accounts of the Thirty Years' War. This author appears to have been acquainted with all the secrets of the time, and, for some reason or other, was able to obtain information in regard to the peculiarities of every one of note. In Part II., Chapter vii., page 179, he says, speaking of Banér and Torstenson's campaign of 1639:

> "*Bannier* went into *Bohemia*, *Torstenson* into *Lusatia*, and *Stalhans* into *Silesia;* and God knows into what condition they put that country, where they found more friends than the Imperialists did in *Pomerania*. He defeated General *Marizini* neer *Chemniz*, and incamped before *Prague*, where he also defeated General

Hofkirck. All the world was amazed at this progress, which against all apparence and all expectation, and which cost so much blood, so much desolation, and so many inflagrations throughout all *Saxonie*, and even to the very gates of *Prague*. Fortune had again turned her back upon the Imperialists, who changed their commander. For, the *Arch-Duke Leopold* was declared Generalissimo or Chief-General, and *Piccolomini* his Lieutenant. Many encounters hapened, in which the *Swedes* had almost still the better and *Fortune accompanied them even to the last, according to the assurance which was given Bannier, bg a certain* PEASANT, WHO WAS BECOME HIS PROPHET."

During the Thirty Years' War there were manifest examples of the stultification of those whom the Almighty had predestined to fall, to stumble, or to go astray, as the prophet coarsely but forcibly expressed it,—in language which seems unpolished to the nicety of the hypercritical ears of this generation,—when he speaks of the oppressor becoming brutish in his arrogance and erring in every work as a drunken man staggereth in his vomit, slipping and finally falling in it. For example, Gustavus could not have acquired all he did and have established his base securely, in 1631, if Austria had not, in consistence with her fatal greed, attempted to grasp all and in the futile attempt periled everything. Had the "disciplined savages," sent into Italy to sack Mantua, been present in Saxony, Gustavus could not have won at Leipsic; and if Ferdinand had not had Wallenstein assassinated in the nick of time for the Swedes, Nordlingen would have arrived two years before it did and the sagacious diplomacy of the murdered Great Captain, Friedland, would have rendered the League of Heilbronn and the recuperation of Oxenstiern and Banér an utter impossibility.

Colonel Malleson, B.A., in his paper or address, read before the Royal British Historical Society, 7th February, 1884, entitled "The Lost Opportunities of Austria," shows that the Peace of Westphalia, 24th October, 1648, left Germany divided into two camps. "Internally—that is, within the limits of Germany—the Peace of Westphalia settled the religious question. Whilst it confirmed the dogma, held by every prince, great and small, as an unquestioned prerogative, that the religion of the prince was to be the religion of the people (*Cujus regio ejus religio*), it left, with rare exceptions, the people practically free to worship God as they chose. (The expulsion of the Protestants of Styria, by the Emperor Charles VI., is an exception to this general rule.) But as, generally, the people of Southern Germany adhered to the old, and those of Northern Germany embraced, in some form or other, the [Evangelical, so styled] reformed religion, the practical result was to divide Germany into two camps,—the Southerners, allied by sympathy with Austria; the Northerners, more or less divided, but prepared, as the sequel has proved, to follow *the lead of a strong Man* whenever *that* STRONG MAN should appear." . . .

"That strong Man" did appear in Frederick the Great, and it was against him, when he had weakened with age and trials, that Austria, in 1778, again manifested her incapability to profit by opportunity.

> "Again, after a term of years, did the question arise [the question of Austria's possession of Bavaria]. Again was the opportunity offered. In the interval had occurred the two Silesian Wars, and the Seven Years' War. The daughter of Charles VI., the illustrious Maria Theresa, ruled over all her father's dominions, lost Silesia excepted. By her side, invested nominally with equal powers, but obliged to conform in matters of high policy to the strong will of the Empress, stood her gifted son, Joseph II. Once again offered the opportunity of incorporating Bavaria, although, this time, not without a battle. The opportunity arose in this wise. Charles Albert, of Bavaria, had lived to enjoy a fleeting gleam of prosperity by his election to the imperial dignity; and had then died, all his ambitious hopes shattered, in 1745. His son, Maximilian Joseph III., had, by the Peace of Fussen, April 22 of the same year (1745), become reconciled to Austria. He died childless December 30, 1777. He was the last of the Bavarian line of the House of Wittelsbach. His nearest of kin was the Elector Palatine, Charles Theodore. But, in virtue of the title of investiture drawn up more than a century before by the Emperor Sigismund, the House of Habsburg had claims, on the failure of heirs to the Bavarian Wittelsbachs, to the whole of Lower Bavaria. Joseph II. then represented, in co-regency with his renowned mother, the House of Habsburg. He did not allow the opportunity to slip. Charles Theodor was childless, and had no hope of children. A lover of pleasure, given to profuse expenditure on his own gratifications, he readily acceded to the claims of Austria to transfer to her the territory indicated in Sigismund's old parchment.
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> "But his nearest relative and heir, Charles II., Duke of Zweibrücken, stepped in to prevent the transaction, appealed to the old jealousy of the aggrandisement of the House of Austria, of Frederic II, of Prussia, and incited that Prince to invade Bohemia, in order to maintain the right of the ruler of Bavaria and his successors to the possessions of the territories intact, just as they had been at the death of the last of the Bavarian Wittelsbachs. This action on the part of Frederic brought on the War of the Bavarian Succession. Joseph, meanwhile, had taken up on the Bohemian frontier, behind the Elbe, a position so strong by nature and so fortified by art, that Frederic found it unassailable. He did all he knew, tried all the tricks and stratagems which had served him so well during the Seven Years' War, to entice Joseph from his strong position, to divide the army, or to leave an opening for an attack. Joseph was not to be tempted, and his quiet persistence completely baffled the great warrior-king. But Frederic did not renounce hope. He had ordered his brother, Prince Henry, to march through Saxony and endeavor to break into Bohemia through Lausitz. With the aid of the army under his orders he would have at his disposal a sufficient superiority of numbers to force the Austrian position. But Joseph had placed in the field, to observe and baffle Prince Henry, an army fifty thousand strong, under the command of his best general, Field Marshal Loudon, a man who had shown his capacity to look even Frederic himself in the face. Able, then, as were the dispositions made by Prince Henry, Loudon baffled them. He did more; he forced the Prince to retreat. He followed him and was on the point of forcing him to deliver, under very disadvantageous circumstances, a battle which [according to Austrian critics and others friendly

to them], if success had crowned his efforts, would have been fatal to Frederic, which would not only have secured the whole of Lower Bavaria, but have recovered Silesia [!?], when his [Loudon's] hand was stayed in the most marvelous manner. The story is thus graphically told by the Freiherr von Janko, in his 'Life of Loudon:' 'On September 8, 1778, information reached Loudon that Prince Henry had crossed the Elbe near Leitmeritz, and had taken a firm position. Exclaiming, "Now, at last, I have the Prince in the position in which, since the beginning of the war, I have wished to see him," Loudon sent an express to the Emperor to promise him, if he would send him only twelve battalions, he would finish the war. The Emperor dispatched the battalions. Loudon, meanwhile, had concentrated his troops; and, hearing that the battalions were proceeding by forced marches to join him, hastened from Munchengratz [where the emperors of Austria and Russia and the king of Prussia met in 1833], to Benatek, crossed the Elbe at Brandeis, the Moldau at Weltrus, and on September 20 took up a position opposite Prince Henry at Budin. His position was in every respect most advantageous for an attack, one of his corps occupying a commanding post on the enemy's left, whilst his front and right were so placed that Prince Henry could not retreat without fighting, whilst in case of defeat his army had no means of escape.'

"I now relate, in the words of the author, the incident which prevented the destruction of the Prussian army: 'With an overstrained anxiety every one in both camps,' writes von Janko, 'beheld the arrival of the moment which was to decide the question of superiority between the two generals, who, according to the judgment of the best-approved strategists, had, during the Seven Years' War, made no mistakes—[for had not Frederic himself declared, to his generals, one day, speaking of the events of the Seven Years' War, "*We all committed faults, except my brother Henry and Loudon.*"' And yet this Loudon, the capturer, in 1761, by a brilliant stroke, of Schweidnitz, was rewarded for the astounding success by a partial eclipse, until events made his employment in the highest command a matter of absolute necessity.]

"But just as Loudon was preparing, on the 23d, for an attack which should be decisive, Loudon was surprised by the arrival in his camp of the Emperor. Joseph had come himself, in order to soften, by his presence, the unpleasantness of the orders of which he was the bearer. The Empress, absolutely determined to bring to an end by peaceful means the dispute between Frederic and herself, had commanded her son to forbid at all costs the risking of a battle, even were a brilliant victory the certain consequence. Maria Theresa, in fact, saw opposed to her only the warrior who, having robbed her of Silesia, had kept that province against all continental Europe. She did not realize the fact that Frederic was no longer the Frederic of Leuthen and Torgau [?], but an overcautious warrior, fearing to risk much lest he should lose all; she dreaded lest, as in former days, a defeat should only make him the more terrible in his revenge. On the eve, then, of a battle which [according to the story of the Austrians and their partial friends] could not have been lost, and which would, in its results, have amply avenged her earlier wrongs, she ordered Loudon to abstain. Loudon did abstain. Peace was concluded. Austria renounced her pretensions to the whole of Lower Bavaria and was forced to be content with the acquisition of the Inn Circle and Braunau, a territory of about a hundred and ninety square miles. The fears of Maria Theresa had lost the opportunity of incorporating the whole of Lower Bavaria and of recovering Silesia!"—(Pages 246–249.) *Transactions of the Royal Historical Society* [*of Great Britain*], *New Series*, *Vol. II.*, *Part III*, *London*, 1884.

Space precludes the opportunity of following out to completeness this line of proof, but it is simply necessary to close the presentation here with the remark of one of the ablest statesmen who has ever lived, William Pitt, that "Austria has always been one year behind the rest of the world with an idea and with an army," or as a military critic worded it, "one idea, one year, and one battle behind time." The Austrians never dared to fight a doubtful or prolonged battle *out*, as Grant said unjustly of the Army of the Potomac, and then, to prove that he was right, proceeded recklessly to fight it to pieces.

Before leaving this subject for good it might be sensible to dwell upon the stupid bigoted arrogance of the Emperor Ferdinand II. and his ghostly advisers, who had several glorious opportunities to pacify the discord, by the application of simple justice: 1, after the battle of the White Mountain in 1620; 2, after the temporarily decisive battles of Wimpfen in 1622, of Lutter in 1626, of Nordlingen in 1634. After those dates neither he nor they had any other such an opportunity, and they had shown their hands too clearly and had aroused passions which nothing but defeat or victory could exhaust or annul, or gratify or avenge. "Extraordinary times," says Becker, "developed equally extraordinary forces, and even more extraordinary men." This was peculiarly the case with the Thirty Years' War. The "Wars which grew out of the French Revolution," which comprise the Napoleonic conflicts of seventeen years, developed no such succession of marvelous leaders. Of all who influenced the end of those more recent twenty-three years, not more than three will live in the far future as "directors of the storm." Wellington! Blücher! and Napoleon! The Archduke Charles[3] might have been added, to convert the trio into a quartette, if he had had more than six hours a day working power in him.

During the Thirty Years' War there was a succession of HEROES. They are named here, not in order of time, but in order of greatness and authority. Gustavus Adolphus, "the foremost man—according to accepted general history—of all this modern world," and his great antagonist, Wallenstein. Schmidt, v. 1, quoting, remarks, "In fact, it is probable that the Protestant party and perhaps the Lutheran (form of) religion in Germany would have been blotted out if Fortune, tired of serving the vast designs of Ferdinand; or, rather, if *Providence by a secret judgment, the depth of which every one must adore,* had not then (at the crisis) raised up the most formidable enemy which the empire ever had, in the person of Gustavus Adolphus, King of Sweden." Bougeant, i. 150; Naylor, ii. 382, justly adds, "A curious confession for a Jesuit!" It is questionable if Wallenstein ranks very far below the former in intellect, *fore*sight. In *far*sight he was fully equal to Gustavus. In *in*sight he seemed to have failed terribly, especially in his selections of confidants, executives, and what the world generally styles friends.[4]

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[3] Croker (1, 314) asked Wellington "whether the Archduke Charles was really a great officer?" *Wellington*—"A great officer? Why, he knows more about it than all of us put together." *Croker*—"What, than Bonaparte, Moreau, or yourself?" *Wellington*—"Aye! than Bonaparte or any of us. We are none of us worthy to fasten the latchets of his shoes, if I am to judge from his book and his plans of campaign. But his mind or his health has, they tell me, a very peculiar defect. He is admirable for five or six hours, and whatever can be done in that time will be done perfectly; but after that he falls into a kind of epileptic stupor, does not know what he is about, has no opinions of his own, and does whatever the man at his elbow tells him."

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[4] The rise of Wallenstein—like that of Wellington—was much more honorable than that of Napoleon Bonaparte, and his fall infinitely more dignified and manly. He was the son of his own great actions, and not one of his promotions but was earned. It is stated by Gfrörer that he commanded, under Dampierre, a squadron of the cuirassiers who delivered Ferdinand II. at the crisis of his fate in 1620, at a moment on which the future of the emperor and his family and the empire turned. He at once became a necessity, and he simply, but grandly, improved his opportunities. Again and again he preserved the Emperor, and he was assassinated by that cruel bigot because he had become too powerful as a subject, when, in addition to his influence, he exhibited a perfect insight into the fanaticism and administration which was ruining his country, and when he gave indications that, with time and opportunity he would traverse the plans of the Jesuits and their pupils, and establish a toleration and justice far ahead of the time and their power of conception. He was an extraordinary compound of crime and virtue. His crimes were those of his period and position; his virtues were all his own. He was mean, but seldom; he was magnanimous, but often. He performed noble and glorious actions, which few men are able, under similar circumstances, to bring themselves to do. He was never little in punishments nor rewards.

The former were annihilating as the other munificent. His great mistake was his conduct at the siege of Stralsund, and even there he would or might not have failed if the Danes and the Swedes had not interfered. The first he disarmed; the second he could neither terrify nor cajole, because their king felt that if he permitted Stralsund to fall, Sweden must inevitably suffer and succumb.

Wallenstein would now appear a very great general if he only had a Jomini, who, after all, was a courtier—often making good appear bad, and evil show as meritorious—and in spite of the injustice manifested by Napoleon towards Jomini, his very selfishness made him a very mild critic of that heartless tyrant and greatly overestimated man.

"The invasion of Gustavus Adolphus, the defeat of the Imperial armies at Leipzig, the conquest of Bavaria by the Swedes, and the death of Tilly" were accomplished facts. The empire was on the brink of ruin, and there was only one man who could save it. This man was Waldstein. When the emperor requested and, at last, implored him to resume the command, he showed that he felt all his

Tilly enjoys an exaggerated estimate. He was a lucky evolution of circumstances which he certainly did not improve anything near to the uttermost, and he was very weak in so far that he allowed himself to be swayed by rash counsels,—for instance, as at Leipzig, 1631, against his own better judgment. In this weakening he sinks exactly to the level of the old Mohawk Valley militia general, Herkimer, who plunged into the slaughter-pit of Oriskany simply because his militia colonels charged him with cowardice and treason if he did not push on blindly, a course which his common sense told him would be suicidal, as it proved to be. Pappenheim's rashness dragged Tilly into the battle he sought to shun and then down to disgrace and death. Ward styles Tilly "an honest old savage, whom a recent refreshingly audacious attempt [of Klopp, Keyin and Company] has failed to whitewash into

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importance. After having declined the position several times, he at last agreed to it on the following conditions:

"That Waldstein should have the sole control of the army, which he promised to raise; and there should be no imperial authority within his camp; no peace should be concluded without his consent, he, as Duke of Mecklenburg, being one of the belligerent parties; *he should have full power to manœuvre and to take up his quarters however and wherever he should find it convenient;* that he should have the sovereignty of the provinces that he might conquer; and that the emperor should give him as reward one of his Hereditary States (Bohemia?), of which he was to be the sovereign, though as a vassal of the emperor."

"The campaign of Waldstein against Gustavus Adolphus has been told in the article on the Thirty Years' War. [*It would require the knowledge of a consummate general to decide whether Waldstein or Gustavus was the greater captain.* ☞But from the moment that Waldstein resumed the command, he directed all operations, and Gustavus Adolphus acted under the impressions which he received from the plans of Waldstein. In his life of Turenne (i. 23) the Chevalier de Ramsay asserts 'Waldstein's fortune balanced that of the Swedish hero.'] Waldstein's defense of the lines near Nurnberg can only be compared with the defense of the lines of Torres Vedras by the Duke of Wellington. The march of the King of Sweden towards Bavaria, after his fruitless attempt on the lines near Nurnberg, was a great fault; and although the king soon perceived his error and changed his plan by rapidly following Waldstein, this circumstance is another proof of what we have just said. It is true that Waldstein lost the battle of Lutzen (6th of November, 1632), but able judges have given it as their opinion that on this occasion Waldstein showed his superiority to the king in the choice of the battle-field, while the king is said to have shown greater ability in the direction of his attacks. But the successful part of these attacks was the merit of Duke Bernhard of Saxe-Weimar, the king having fallen in the beginning of the battle, while engaged in rallying his troops, which were disorganized in consequence of those fruitless attacks which he directed."☜

"As to the military conduct of Waldstein after the battle of Lutzen, we shall only add that he punished with death many generals, colonels, and inferior officers who had not behaved well in that battle. He soon repaired his losses, and his arms were victorious in Saxony and Silesia."

a Christian hero!" How different the decision of Schuyler, the real conqueror of Burgoyne, in regard to the relief of Fort Stanwix!

Mansfeld, "the German Attila," was a far more remarkable man than Tilly, more bright, resolute and endowed with greater individual resources, although far less moral than the old lay-Jesuit. Although not handsome or well-formed he loved the other sex, and he always had a bevy of beauties about him, but with his amorousness and acquisitiveness he was destitute of fear, and could rule the ruthless hordes around him with a hand of iron which made the fiercest quail. Witness his putting down a mutiny: Gfrörer tells us that in a small most unattractive body dwelt an ever-restless soul. Nature had formed him to be a military leader, and with a power almost unexampled he knew, when he chose (which, however, seldom happened), how to curb his lawless troops. Once, during the Bohemian War (1520), a crowd of soldiers thronged his doors and demanded their pay, long since due. All alone he came out, cut two down, and wounded a lot more. Then some six hundred pikemen rushed upon him whom he drove off. Fearlessly, Mansfeld, followed by three captains, mounted, rode right into the mass of mutineers, shot eleven, wounded twenty-six, and made the whole submit. As a rule, Mansfeld let his soldiers have free course in a country. He was Wallenstein's instructor in demonstrating how to make the people maintain his army through sheer robbery. In this he was mightier than a king. The British general, Sir Edward Cust, author of the "Annals of the Wars," and a number of military biographies of the highest order, states that Mansfeld "is regarded as one of the greatest generals of the seventeenth century; but he was too reckless of gain to have been a good disciplinarian, and his strategy was rather the effect of experience than of study." If trustworthy reports of his improvements have been handed down, he developed "a well-organized system of vedettes and patrols, which constitute the eyes and ears of an army." The claim for him that he was "the first to employ dragoons in warfare," or horse-musketeers, must simply mean that he assigned them to duties most proper for their peculiar arms, etc., and discipline, for they were an arm apart long before, as shown in J. W. de P.'s Articles on "Cavalry," in *The United Service:* I., September; II., November; III., December, 1880.

Mansfeld was a diminutive, sickly-looking, deformed man, but he possessed the soul of a true hero. Constantly persecuted by fortune, he was to the last [bore himself] superior to his fate, and he merits immortality, for he had always proved himself [personally] superior to adversity. He was a very eloquent, persuasive, and successful negotiator, raised armies with incredible rapidity, was bold in council, fearless in danger, fertile in resources, resolute, and never shrinking even under the most adverse circumstances. The French, who felt the weight of his blows, gave him a nickname equivalent to "Bloody Bones;" the Imperialists styled him the "Attila of Christianity;" and disinterested military critics, "the Ulysses of Germany." Romanists and politicians may abuse Mansfeld as they will, but they cannot destroy the proof of his frequent exhibitions of magnanimity and consistent heroism. Nor did Christian of Brunswick fall behind him in the latter exalted quality.

Christian of Brunswick, the Achilles to this Ulysses, was his pupil. Schiller speaks of them as "two men worthy of immortality, had they been but as superior to their times as they were to their adversities." They, private individuals, by their force of character, kept alive the war against an empire and a league for six years, and had these troops enjoyed the advantages of those of Tilly and Wallenstein, they would have checkmated both Emperor and Princes. The world rolling on, subject to inevitable law, as Seneca wrote eighteen hundred years ago, expressing the ideas of philosophers long antecedent, and indorsed by the deepest reflection ever since, must attribute the failures of the good, the honest, the truly brave, and the rarely unselfish to the fiat (Fate) which the good and wise Arnold adduces as the only valid excuse for Hannibal's not marching on Rome after Cannæ, "God did not will it to be so."

"All accounts of the times are full of numberless stories of Christian's contempt of death, of his fury in combat." Like Mansfeld, his preceptor, he was fond of beauty and liked to see it around him. He is the only leader of the period who appears without beard or moustache. He died before he was twenty-six, of poison, it is supposed, administered by the emissary of his enemies.

As a levier or creator of armies out of apparent nothing, the almost Boy-Bishop Christian of Brunswick, or the Halberstadter, dubbed Knight of the exalted British Order of the Garter by James I., in 1624, rises up almost like a giant. Greater than Murat as the leader of a charge of cavalry, he was already a captain of dragoons in the Dutch service before he had any sign of down upon his lip. This is the best proof of his fitness to lead men, because the Dutch were too economical to trust a squadron of those horsemen which cost them so much money, to any one who did not know how to command and handle them to commercial as well as to military advantage (Dalgetty). His cavalry charge at Fleurus is admitted to have been one of the most gallant of the kind during the whole Thirty Years' War,—superior to any made by Pappenheim. Gfrörer corroborates this, in that he reads, "The day of Fleurus was the most brilliant of the whole of Christian's warlike career."

It is claimed that Gustavus Adolphus styled Pappenheim "the Soldier." Mark the title; *not* General, but Soldier; and, drawing the attention to the true distinction between the definitions, the intrinsic difference between these two titles "Let him (Pappenheim) fleet on,"— "Be air!" and disappear among the shades.

Of the Germans, Bernard of Saxe-Weimar was *the* hero, and wherever undaunted courage without pure generalship could win, he won. The triumph at Lutzen was solely his,—always remembering the extreme ability of the Swedish lieutenant-generals, and the gallantry of their troops, pretty much all expended on that field. The same rashness or desperation lost Nordlingen, which almost neutralized Lutzen. At Rheinfelden, his career of success would have ended had it not been for the generalship of the "Perfect Captain," the mortally-wounded Huguenot, Duke de Rohan. It is questionable if the partisan, the sly Königsmark, was not equal to Bernard in military capacity and enterprise, yea, even to Turenne; during this war, as a lieutenant or subordinate he was far his superior. But oh, what a succession of heroes did Sweden bring forth. As one fell, another took his place, great, greater, the greatest, Torstenson, "under Sweden's crown Sweden's greatest commander;" greater as a general than even his sovereign, Gustavus, greater as a fighter than Banér, greater as a disciplinarian and humanitarian than Horn, greater than all the rest in his combination of genius and talent, as a commander of infantry, as a leader of cavalry, and as a handler of artillery; a *Feld-herr*, a diplomatist, a man of culture, learned in classic lore, a lettered man with a developed taste for the fine arts. "*My* LENNART," as Gustavus affectionately was wont to style him, who thought that next to Torstenson came Nils Brahe, killed at Lutzen. Then came Banér, hyperbolically styled "the second Gustavus," who owed his greatest triumph and much of his other successes to Torstenson; then Lilijehoek, killed at Leipzig second, who was esteemed much higher than Wrangel, Jr., who had the luck to finish the war, a good fortune due in a great measure to his having been dry-nursed by Torstenson when the latter could no longer keep the field in person and command. Last in this list, which cannot be extended for want of time, comes the nephew of the great Gustavus, afterwards known as Charles X., Gustavus, king of Sweden, who would have superseded Wrangel had the war lasted a few months longer, and have enjoyed the credit of finishing it. He rather belongs to the Germans than to the Swedes, and it is as hard to rank him as a general as it is to place him as to race. He did great deeds. He was the conqueror of Poland and of Denmark, and if the Dutch and English had not interfered with their fleets and diplomacy, he might have accomplished the union of the "Three Northern Crowns," and constituted a kingdom strong enough to act as counterpoise to Russia. Neither Bernard of Saxe-Weimar nor Banér surpassed him in audacity and enterprise, but he lacked all the discreet characteristics of Torstenson, whom he recognized as his preceptor in the Art of War.

Without forgetting or depreciating the solid, *the cube-like* greatness of Gustavus Adolphus, or the brilliant soldiership of Charles X. Gustavus, more than one historian who has considered their careers with philosophic clearness and calmness, has come to the conclusion that it is questionable if the enterprises of both were not as exhaustive to Sweden as what has been styled "the madness" of Charles XII. (Horace Marryatt's "One Year in Sweden," II. 229, de P. alcove N. Y. S. L.) Gustavus Adolphus and his immediate pupils in war were to Sweden what Epaminondas was to Thebes, but just as Thebes was too weak to keep up the exertion requisite to maintain her supremacy in Greece, which Epaminondas, "the greatest of the Greeks," bestowed upon her through, and solely through his supreme individual force, just so Sweden was too poor a country to stand the drain made upon her resources by Gustavus Adolphus and Charles X. Gustavus. She was bled so profusely by them that, had not the cool-bloodedly astute or cruelly sagacious Charles XI., intervened and stopped the hemorrhages and allowed her veins to fill again, and administered cordials to reinvigorate her, through his "Edict of Restitution," or seizure or reappropriation of the prodigal gifts of the crown-lands and appanages, etc., to favorites deserving as well as undeserving, Charles XII. would have found no strength left to expend on his wild career of conquest and military crusades, for they were little less, however boldly and ably carried out, until arrested at Pultowa by superior multitudes of barbarism piled upon him, suffocatingly, by a semi-barbarian despot, Peter the Great. (See the Vicompte de Vogue's "True Story of Mazeppa.") As it was, the Rise, Increment, Apogee, Decline, Fall, and Syncope of Swedish influence began with the coronation of Gustavus Adolphus in 1618 and ended with the death of Charles XII. in 1718. This unnatural strength almost reminds the observer of the effort of the empiric called in during the last illness of Louis XIV., who by his "heroic treatment" and stimulants, seemed to restore the moribund. When the effects, however astonishing for the moment, passed off, the gangrene resumed its progress or sway and hope was at an end.

A thorough study of all accessible authorities, and they have been very numerous,—Swedish, German, French, and English,—leads to the conviction that in some respects the character of Gustavus Adolphus has never been correctly presented. He was not the faultless man that his eulogists would have people to believe. His violent temper, which often carried him to extremes, his love episode with Ebba Brahe, —"the memory of this early love cast a gloom over his whole existence,"—and his amour with the Dutch maiden of Gottenborg, who gave birth to his only son—afterwards a Swedish general, Count Wasaborg,[5] who was wounded at Wittstock by the side of Banér and Torstenson—and a hundred other incidents of his life, show that he was simply a mortal after all; an exceptional one, however, and therefore greater in that he was not a miracle or a demigod, but one, as St. Paul exclaimed, when the citizens of Lystra would have worshiped him as a god, "We also are men of like passions with you." In fact, Gustavus was not so faultless or perfect a man as generally held up to be by moralists and optimists, because he often displayed human weaknesses and human policy; but when his nobler qualities of heart and mind are weighed against all the blemishes which can even be alleged, he was indeed GREAT, because represented as he is, or can be, he was after all a MAN, and what the world—humanity—needs in its crisis is a MAN, and "MEN AND DEEDS," as Duncan Macgregor sings so grandly in his "*Clouds and Sunshine*:"

"Wanted: MEN!
Not systems fit and wise,
Not faith with rigid eyes,
Not wealth in mountain piles,
Not power with gracious smiles,
Not even the potent pen;
Wanted: MEN!

"Wanted: DEEDS!
Not words of winning note,
Not thoughts from life remote,
Not fond religious airs,
Not sweetly languid prayers,
Not love of cant and creeds;
Wanted: DEEDS!

"MEN AND DEEDS!
MEN that can dare and do;
Not longings for the new,
Not pratings of the old;
Good life and action bold—
These the occasion needs,
MEN AND DEEDS!"

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[5] After the death of his daughter Christina, unmarried and without issue, the direct line of Gustavus was extinct, but has still representatives in Sweden through this Count Wasaborg, whose eclipse and disappearance is another proof that great

There are always two sides to every story, although one may be strongly authenticated and the other comparatively weak and even only problematical, nevertheless in a number of cases the latter may eventually prove to be the most trustworthy in its realization of the spirit,—that spirit which maketh alive when the letter killeth or seemeth to kill. Gustavus Adolphus was not the disinterested man he is held to have been by simple panegyrists. He was not the saviour, pure and simple, that he appears in his biographies. He did not enter upon the German War directly from the impulse of religious duty or sympathy. He was impelled by state policy, by military strategy, by ambition,—yes, as he regarded the matter, by necessity; by all these motives, as well as by religious duty and feeling, and by devotion to the truth.

Gustavus was learned in classic lore and took Cæsar and Scipio for his models (Becker ix. 56). The former taught him to seek out the enemy abroad, as Cæsar did in the country east of the Adriatic to keep war out of Italy, and away from Rome, the aim of that war as Washington was the grand objective of the "Slaveholders' Rebellion;" and Scipio was an example that it was wiser to carry war into the Africa of Gustavus (Germany) than to let an imperial Hannibal (Wallenstein) bring its miseries into Sweden. Memnon gave the same military advice to Darius, and had it been followed, the career of Alexander the Great in Asia would be read very differently, if indeed it would be read at all.

The chief element of Sweden's intrinsic strength lay in its peninsular position, which justified Gustavus Adolphus in electing an aggressive which was eminently a defensive-aggressive, instead of submitting to a purely defensive, the latter a course which, in the long run, is inevitably suicidal. Sweden—under the circumstances of the period, with naval strength untrustworthy as to time and combination—occupied the same position as to Wallenstein and as to the Empire as England did to Napoleon; or, more properly, that England under Elizabeth did to Spain and its imperialty of wealth and force—Scotland paralyzed by intestine greeds, rivalries, and religious antagonisms, just as Denmark had been too much crippled by Tilly and Wallenstein to interfere again in a quarrel in which, had it been true to its own hates and perhaps interests, it might have been wise to interfere or else keep quiet ever after, which the Danes had not the sense to do. Denmark

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men must have great mothers as well as great fathers. This justifies the rule of the Semitic and other races, who only trace descent through the mothers.

at this time acted just as Prussia operated in 1805, when in cordial, active union with Austria and Russia, Napoleon, the Wallenstein of another period, must have been beaten. Again, in 1806, Austria was equally derelict, when Prussia and Russia were combined, justifying the fear of Jomini, who expected that the Hapsburg—if the leopard could under any circumstances change its spots—would take advantage of Napoleon's defeat at Preuss-Eylau—for defeat it was if Benningsen had only had one or two more roast potatoes to give him physical strength to hold on—should issue forth from the sally-ports or passes of its bastion of Bohemia, take the French in the rear, sever their communications, and annihilate the common enemy. Alas! human beings, even those esteemed the wisest, in accordance with "the Conventional Lies of Civilization," seldom, if ever, act in obedience to horse common sense, but are almost always submissive to what is oftenest most foolish policy and sheer diplomacy.

It was through this endeavoring to combine the spirit of worldly policy and gain and the spirit of religious conviction and dedication that he fell at Lutzen, or failed. Remember that the bitterest denunciation was launched against Laodicea, not because it was the most derelict of the Seven Churches, but because it was "neither cold nor hot." "You cannot serve God and Mammon." So far as ability and learning are concerned, Zwingli was a far greater man than Luther, but he strove to overcome through a coalition, through the sword of spirit and the sword of flesh; to unite religion, military force, policy, and politics; and he fell, comparatively young, at all events in his prime of intellect and strength, on the field of Cappel, just as Gustavus was slain in his prime at Lutzen. Luther held fast solely to the sword of the spirit and abided firmly thereby, and, as he triumphed through that at the Diet of Worms, he stands triumphant to-day and realizes the inspired language of the prophet and chronicler in regard to David:

> "And I [the Lord] was with thee whithersoever thou wentest, and have cut off all thine enemies out of thy sight, and have made thee a great name, like unto the name of the great *men* that *are* in the earth."

Gustavus Adolphus, to repeat for emphasis, strove to combine religion and ambition, piety and policy, and diplomacy and the sword, and when he stood highest, he fell. He seemed to realize this at the last and to comprehend the terrible truth, as if the light of eternity shone upon his spirit through the veil of mortality. When the population of Naumburg prostrated themselves adoringly before and about him, this idea flashed upon his mind and he became prophetic in the presentiment which was realized within a few days.

To demonstrate that Gustavus is not altogether regarded as a model of disinterestedness, consider the words of one of his greatest admirers, an English clergyman, B. Chapman, London, 1856, in his "History," vii. 191:

"It is common fashion with German writers to attribute the interference of Gustavus Adolphus in the Thirty Years' War to a grasping ambition; and one of the latest 'historians of that nation [Gfrörer] has not scrupled to say that he came to Germany as a robber.'[6] This

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[6] The word "*robber*" has eluded careful search in the revised edition of Gfrörer of Dr. Klopp, but Gfrörer certainly emphasizes his idea that Gustavus came into Germany on his own account and for his own purposes, *against*, especially not with, the will of Duke Bogislaus, of Pomerania, and almost all the other princes who had reason to be most interested in his advent.

Even Menzel, so lavish in his praise of Gustavus, says a great many hard things of the Swedes. He says (384): "Peace, nevertheless, could not be concluded (1641); France and Sweden still sought to tear the *prey* from each other's grasp;" and (385) "Sweden solely aimed at the conversion of the German coasts of the Baltic into a Swedish province." He calls (392) Turenne's army a "robber band;" styles (381) Königsmark one of the boldest robbers of the day (388), who "pillaged the country on his own account," and Gindely (124) charges Banér with having amassed through plunder and left one million dollars; an enormous fortune for the period; Schiller (321) states that, in 1638, "booty was his [Banér's] sole object." Burgus (71) (Naylor II. 406) an enemy, in opposition *to all*, thus eulogizes the Swedes as soldiers: "Constant and patient in adversity, bold and determined in battle, and modest and affable to the peasantry and those upon whom they were quartered." The strength of the Swedes was in their hardy recruits and disciplined veterans, led by generals trained and instructed by theory, practice, and example. The imperialists, Bavarians, and Germans, generally, had nothing to compare with the latter. Their leaders were kinglings, princelings, and court favorites, like our own political humbugs and members of rings—military and administrative. Therefore to Germany could be applied the terrible invective of Ezekiel, "Thou land devourest up men," and the graphic first chapter of Joel, describing the successive desolations of Tilly's, Mansfelds, and Christian of Brunswick's bands, of the Friedlander's hordes, of the merciless army of the Empire, and finally of the contending forces, Swedish, French, Bavarians, Empire, and Circles.

The clear, accomplished, celebrated military critic, VON CLAUSEWITZ, in his "*Militarische Briefe eines Verstorbenen an seine noch lebenden Freunde . . . für Eingeweihte und Laien im Kriegswesen, Dritte Sammlung*, Adorf, 1844, goes into a close comparison between the careers and their results, of Gustavus Adolphus, Frederick the Great and Napoleon. This comparison covers many pages but can be summed up, briefly, as follows: von Clausewitz begins with the just remark that kings endowed with military capacity cannot be compared with other generals, because they are in possession of greater power in every way and are likely to be more implicitly obeyed and better sustained by their subordinates. Wallenstein understood this, and with reason attributed his coming short of success on many occasions grave charge has no real solidity. Not without repeated solicitations from the depressed and deprived among the Germans themselves, not until the war (through the element of Catholic aggression involved in it) had become, as Geijer truly observes, 'the common concern of Europe and mankind,' did Gustavus invade the empire. And though, no doubt, he expected great rewards for himself and nation, if his efforts in the common cause should prove successful, the nobler motives which prompted him to engage in it were tainted by no base cupidity. His expectations were founded in reason and justice. He had a right to look for requital—in the event of victory—for the risk he ran, for the great service he rendered, either from the honesty or gratitude of the restored, or from the spoils of those who had provoked the contest. Nay, more; without exposing himself justly to the charge of a greedy ambition, well might he have meditated the dissolution of that confederacy which was no longer the result of a harmony of feelings and interests, and sought by a new combination of a part of the Germanic body under his own protectorate substantial guarantees for Protestant independence and peace. Various indications of such a policy, not absolutely determined, but roughly shaped out, to be developed and modified according to the course of events, and the counsel and inclination of the Protestant states in alliance with him, will be seen in the following pages [of the history quoted], and especially in the account

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to his not being adequately supported. And here let it be remarked that, strange to say, there are only two generals in history who never had a mutiny in their armies, although composed of the most heterogeneous elements, and were never disobeyed either by present or distant subordinates,—Hannibal and Torstenson, "the modern Hannibal." Few are aware that Gustavus had open mutiny in his camp at Nuremberg on the 22d July, 1632. His troops rebelled against the strict discipline which he attempted to enforce (Gfrörer, 767), and when he desired to lead them out against the enemy they refused to fight before their arrears of pay were given to them; and the citizens of Nuremberg had to lend two tons of gold (two hundred thousand rix-dollars, equal, at least, to $1,000,000, if not $2,000,000 of to-day). Wellington was of opinion that Napoleon "was in more awe of his marshals than was generally supposed. He acted as if he was not sure of their obedience; for instance, he would order one of them to take another under his command, but he never ventured to tell the other to obey him" (Croker Papers, i. 312); and he was several times positively disobeyed. Wellington was often disobeyed in the most startling manner. Sir William Stuart imperiled the army by direct disobedience after, or during, the retreat from Burgos. Crawford, at times would do just as he pleased in the teeth of his orders, and Picton was "consistently disobedient." It was astonishing how Wellington could put up with it, unless he had to do so. Torstenson would not stand the slightest nonsense. He was emphatically what the Romans styled "*Vir Auctoritatis*" and the Greeks "*Anax Andron.*"

of the king's conferences with the Council of Patricians at Nuremberg in the summer of 1632."

Chapman, in citing one of the latest German historians, means Gfrörer (p. 1016), whose words are: "*Niemand hat Gustav nach Deutschland gerufen. Wie ein Räuber ist er in unser Reich eingebrochen,*"—*i.e.*, "No one invited Gustavus into Germany. Like a robber did he break into our Empire." Gfrörer has written the best Life of Gustavus Adolphus and History of the Thirty Years' War, down to the death of that king, which the writer has ever read or examined with care; not, it is true, in the original edition, but in the fourth, revised and improved by Dr. Klopp, after the death of the original author. In this, the direct assimilation of Gustavus to a robber is not to be found in the exact words quoted by Chapman, but it is implied again and again. Gfrörer said (522) that Gustavus had determined on the invasion of Germany long before he carried his plans into execution. That "war he would have, and war at any price" (536), and compares his impulse to the ambition which spurred Alexander to attack Persia, concealing his real motives with the blinding words of religion and the Gospel. Gfrörer undertakes to prove it, and again and again returns to the subject, quoting still existing testimony. For instance, among many other arguments, the Swedish party claim that Gustavus crossed the Baltic to deliver Duke Bogislav, of Pomerania, from the oppression of the Emperor, whereas Gfrörer declares, even when the king was about to embark, Bogislav, so far from welcoming the fact, conjured him in the name of Heaven to stay at home. Gustavus could not heed this beseeching appeal of the Pomeranian Duke—afraid of being ground to pieces between the upper millstone of the Imperialists and the nether millstone of the Swedes—to stay at home, because it was impossible and contrary to the only plan of operations which could promise eventual success. Pomerania was the inevitable Swedish military base. They already held Stralsund, and they needed the other fortresses and strong positions in the Duchy to insure their "lines of communication and supply," and cover their retreat in case of ultimate remediless reverse. Pomerania was indeed subsequently more than once their refuge, without which they might have been driven into the sea. So Bogislav had to receive with open arms, as friends and defenders, the self-constituted allies who, he fondly hoped, would not force themselves, sword in hand, upon him as such. Many of the most touching episodes of history resolve themselves into grim jokes when the naked truth is revealed, when denuded of its clothing of arguments, its mask of hypocrisy, and its veils of deliberate lies.

Yet when Gfrörer, an absolute German and no more, presumes to say Gustavus broke in as a robber, and the eulogists of the Swede that he entered as a deliverer pure and simple, they both falsify facts. He came as neither. He came as a great king, captain, and statesman, because it was his true policy to do so and the end justified his calculations. (Naylor, II., 382.) He was to the Germans what Isaiah prophesied Cyrus would be for the Jews,—"called and chosen,"—but nevertheless he was exactly what the Prophet styles such deliverers in another chapter, "a punishing-rod and an instrument of vengeance," to be broken—as was Gustavus—when his work was complete, although incomplete to his own mind.

There is not the slightest doubt that after admitting, which is incontrovertible, that the origin of this most horrible of all awful wars was the result of Jesuit planning and teaching and inciting, it would not have assumed its terrific extent and form, if greed, state policy, individual selfishness and ambition had not grasped the opportunity to add fuel to the flames. Priestcraft and its pupils converted Germany into a Gehenna. Without them it would have been a war like our civil war, the "Slaveholders' Rebellion," vast and costly enough, but still free from the unparalleled atrocities which characterized it; whereas the "Slaveholders' Rebellion" only presents hideous blotches, all on one side, such as Belle Isle, Libby, Andersonville, and other prison-pens. What is more, cruel as were the Romanists towards the Protestants, they were equally oppressive to their own people, and set an example which, a Protestant regrets to say, was imitated on all sides and in every direction, until even the most humane found it necessary to "fight with fire." Admit that the Gothic Cæsar was selfish and ambitious, and even yet enough virtues must be conceded to him to justify his elevation to the highest rank among the great and good men in all ages. His great fault was that he did not at the opportune moment shut his eyes to the lure of ambition and solely remember that the Protestants of Germany, as Gfrörer himself admits, yearned for his appearance among them as a saviour, as the Jews looked forward to the coming of their Messiah. Had he been that Deliverer, pure and simple, he would have gone to Vienna after Leipzig and have indeed delivered his co-religionists of the Austrian Hereditary States from the horrible oppression to which they had been subjected through the Jesuits and their plans and pupils.

Butler, in "Hudibras," has four witty, and, at the same time, truthful lines in this connection:

> "For none but Jesuits have commission
> To preach the Faith with ammunition,
> And propagate the church with powder;
> Their founder was a blown-up soldier,"—

their founder Ignatius Loyola,—who, originally a courtier and soldier, aspiring to the love of the highest lady in the land (his queen it is said), having been crippled by a wound in the leg at the Siege of Pampeluna, in 1521, became transformed from a man of the world into the astutest priest and religious organizer in the world.

In an imaginary conversation between Mars and Minerva—whom Homer, by the way, makes superior in military gifts and powers to the god—the goddess asks if the war-god had not severely blamed Gustavus for not having marched directly upon Vienna after his victory at Leipzig (I. p. 10), and Mars does not give a positive answer. Afterwards he goes on to excuse the king, even against such high authority, that it is impossible not to cite, again and again, the opinion of Oxenstiern, who held to it firmly throughout his life, and yet it is well known that the chancellor was by no means an enthusiastic man.

In the action of Dirschau, Gustavus, reconnoitering, was wounded in the arm. Oxenstiern remonstrating respecting his reckless exposure on this and other occasions, the king replied, "You are of too cold a temper;" or, "You are so cold, upsetting my plans when most prepared for a bold expedition." "Possibly," replied the great chancellor, "but if my ice did not sometimes cool your fire, your Majesty might have been consumed before this;" or, "I am so, if I did not throw cold water on your Majesty's fire, you would long since have been reduced to ashes." As to the feasibility of the march upon Vienna after Leipsic I., the admission of the king himself is all-sufficient. The battle was fought 7th September, 1631. On the 14th Gustavus wrote to his sister, "*The enemy has been so much destroyed that* WE COULD GO UNHINDERED WHERE WE WISHED." This language is too clear and decided to admit of question.

Of the three great modern captains, Von Clausewitz considers Frederic the Great entitled to the palm, because he attained the object at which he aimed from the beginning. Crowned with the laurels of victory Gustavus certainly received a very serious check when he came in contact with Wallenstein, and who would have eventually remained master of the field is one of the unsolved questions of history,—insoluble because Gustavus[7] fell a victim to his own rashness or to assassination at Lutzen, and Wallenstein was soon after assassinated in turn by an ungrateful master whom he had served too well. As for Napoleon, he actually overstepped the limits of the possible, and he was an utter failure. Frederic never once transgressed or passed beyond the limits of his abilities. He fully comprehended and steadily kept in view the objective of his original plans, and as "old Fritz" is the only one who brought his work to a perfect conclusion, to him must be conceded the honor of being the greatest commander of modern times, and he deserves the credit the more because he contended triumphantly and longer against greater odds and difficulties than the others.

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[7] If the careful singling out of a redoubtable adversary with the intention of putting him out of the way surreptitiously is assassination then was Gustavus

As an evidence of the effect of the glamour of a great name upon all but a very few, the majority accepting its subscriptum as an incontrovertible authority upon the minds of the vast majority of even thinking people, take the utterances of Napoleon Bonaparte, as recorded by Count Montholon, in regard to Turenne. Napoleon cites Turenne as one of the seven great military exemplars of all times. There was nothing like genius ever evinced by Turenne. He was the soul of cold-blooded calculation. Napoleon admits this (M. iii. 57). Comparing the conduct of Marshal Ney in 1815 with that of Turenne in 1650, he says, "Turenne acted from calculation and moved by the ambition of ruling the councils of the regency, when, forgetting his oath to Anne of Austria, and declaring himself in favor of the opposite party, he marched upon Paris. Ney did nothing similar to this."

Again (M. iii. 241-42), he enunciates another *dictum* in which it can be proved he makes as many mistakes as there are sentences.

> Turenne made *five* campaigns before the treaty of Westphalia. . . . "In 1646 he set out for Mayence, descended the left bank of the Rhine as far as Wesel, where he crossed that river and ascended the right bank till he reached the Lahn; formed a junction with the Swedish army [as if it belonged to him!] passed the Danube and the Lech, and thus performed a march of two hundred leagues across an enemy's country. When arrived on the Lech, he had all his troops united under his own command, having, like Cæsar and Hannibal, abandoned his communications to his allies, or rather, having consented to separate himself for a time from his reserves and his communications, reserving only one place of depot. There was nothing extraordinary in this. Armies were very small and had to live from hand to mouth, and Menzel considers the Turenne's army a 'band of robbers.'"
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> In 1648 he passed the Rhine at Oppenheim, formed a junction with the Swe-

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Adolphus most assuredly the victim of such a crime. Maurice de la Châtre, in his "Histoire des Papes," Paris, 1848, writing evidently without bias, for he condemns Wallenstein while painting the character of Ferdinand II. in repulsive colors, says, Vol. IX, page 18, "Gustave Adolphe et Wallenstein se recontrerent dans les plaines de *Lutzen*, et livrerent une *bataille terrible* dans lequelle le *roi de Suede* succomber *victime de la trahison.*"

dish army at Hanau, advanced along the Rednitz and retrograded on the Danube, which he crossed at Dillingen; defeated Montecuculi at Cusmarshausen, passed the Lech at Rain, and the Isar at Freising; the court of Bavaria became alarmed for its safety, and quitted Munich. He next fixed his headquarters at Muhldorf, which he laid under contribution, and ravaged the whole of the electorate to punish the elector for his insincerity."

Now to criticise the great Corsican!

After the annihilating overthrow of the French and Weimarians at Tuttlingen, 24th November, 4th December, 1643, Turenne was sent to take command of the French army of Germany. This was in December, 1643. If he accomplished anything worthy of note his successes seem to have made little impression on the French ministry since, in July, 1644, he was superseded by the Duke d'Enghien (the great Condé) and served under him until the troops went into winter quarters, October–December, 1644. In March, 1645, Turenne, left to himself, again advanced into the Palatinate, and on the 2d–3d May he was surprised by the Bavarian Field-Marshal Mercy, and, according to existing circumstances, was whipped as disgracefully as Rantzau at Tuttlingen, in 1643. Mercy took almost the whole of the French infantry, ten guns, and all the baggage. Shortly after he was joined by four thousand Hessians under Königsmark—a man of royal mark, a king among generals of ordinary calibre. With this assistance Turenne forced Mercy to raise the siege of Kircham (Kirchheim). His defeat at Mariendahl or Mergentheim, and whatever he did or did not do, subsequently resulted, much to his mortification, in his second supersedure, 1st July, 1645, by the Duke d'Enghien. On the 3d August, 1645, occurred the battle of Allerheim, or Nordlingen second. At the crisis of this battle, Mercy, who considered the victory secure, was killed and the French enjoyed the glory of a drawn battle like Antietam. (Koch thinks Mercy was killed by the accidental shot of one of his own men, as is claimed, incorrectly however, to have been the case with Stonewall Jackson, and undoubtedly was true of the desperate wounding of Longstreet. The Third Corps A. of the P. pretty clearly prove Jackson was killed by a volley of one of its Regiments, the First Massachusetts Volunteers.) To prove that this could not have been any decided success for the French, the opposing forces continued facing each other not more than five or six leagues apart, for over two and a half months, until 17th October, 1645. All this time, Turenne was responsible for the paralysis, since he was in full command, the Duke d'Enghien having left the army after winning the field of Allerheim.

This brings the story down to 1646, when Napoleon commences his *dictum.* Turenne did nothing of note in this campaign by himself, for he was united with the Swedish Field-Marshal Wrangel, who was always acting under the inspiration of Torstenson, if Wrangel was not all the time coached or dry-nursed by that great captain. In regard to Torstenson, Turenne exhausts eulogy in exalting his superior abilities; not that Torstenson needs his approval. For Turenne to endorse Torstenson recalls the words of St. Paul to the Corinthians (II. Cor., iii. 1), "Need we, as some *others*, epistles of commendation to you, or *letters* of commendation from you?" Turenne and Wrangel were likewise assisted by Königsmark, who ranks with the ablest commanders developed by the Thirty Years' War, and with less means accomplished a great deal more than Turenne ever did.

What is more, Wrangel waived the chief command in favor of Turenne as a mere matter of policy, to propitiate the vanity of the French court, for Turenne had brought up only nine thousand men; Königsmark five thousand; and the Hessians four thousand six hundred; and Wrangel had twenty-three thousand. The fact is the allies had pretty much everything their own way, since the Imperial commander-in-chief, the Archduke Leopold, did not dare to venture a battle and "buried himself under accumulated earthworks,"—as Birney said of the heavy artillery regiments in the Wilderness—which the allies did not deem it advisable to attack. This conduct of the emperor's brother so disgusted the Elector of Bavaria that he entered into an armistice with the allies. This campaign of 1646 is the first mentioned by Napoleon as indicative of Turenne's greatness. If Turenne did win any laurels he must assuredly share them with Torstenson who planned, and Wrangel and Königsmark, who had so much to do with the execution.

In 1647 Turenne was recalled to the command in Flanders, and in the course of the summer lost, through his own or his (the French) government's injustice to them, the greater part of the Weimarian troops, who went back to the Swedes, to whom they originally and rightfully belonged.

In December, 1647, as the Elector of Bavaria had broken his pledges in taking up arms again in favor of the emperor, Turenne was ordered back into Germany, where he once more united with the Swedes and their confederates under Wrangel and Königsmark, and advanced again in May into Bavaria.

Napoleon says that Turenne defeated Montecuculi at Cusmarshausen. This is an error. The Allies defeated Melander at Z(S)usharshausen. Montecuculi was a mere subordinate, a general of cavalry, and Gronsfeld, who commanded the Bavarian contingent, and Montecuculi stopped the victorious career of the Allies and saved the remnants of an army which Melander had nearly sacrificed by his mismanagement. There was now no Imperial army fit to resist the Allies until Piccolomini got back from the Low Countries and gathered together a new army and forced the Allies in turn to retreat. In the midst of a "Campaign of Manœuvres" (ironical), peace ended hostilities,—a peace due in a great measure to an independent, bold, and happy stroke of Königsmark.

Now it would bother even Napoleon to demonstrate conclusively to a competent critic what great genius Turenne showed between 1644, when he first held command in Germany, and during the four years which intervened before the war closed. He was subordinate in two indecisive victories, and he was surprised and utterly cut up in the only conflict in which he was exercising an independent chief command. It has been observed again and again that "even a great general may be defeated; but there is no general of any capacity whatever who can find an excuse for allowing himself to be surprised." Koch shows up Turenne and justly disposes of the French claims to doubtful victories, at best drawn battles. Without the great Swedish Leaders, in Camp and Court, the French would have been nowhere in this war.

What is more, Turenne and the Swedes had no great general opposed to them in the campaigns, or three years cited, by Napoleon.

It suited Napoleon's policy to compare himself to Charlemagne (Charles I., *Karl der Grosse*, Charles the Great) and to Louis XIV., the *magnificent*, claiming the one as a French emperor, and both as French sovereigns. He chose to forget that Charlemagne was one of the great Germans and not a Frenchman at all, and that the career of Louis XIV. terminated anything but gloriously in spite of Turenne,—almost as bad as his own did for him. Turenne was one of the ablest of the generals of Louis XIV., but to justify his appearing in the same class with Alexander, Hannibal, Cæsar, Gustavus, and Frederic, requires more proof than truth can furnish, or even the *dictum* of Napoleon can establish.

And now let us examine the claims to greatness on the part of the other six of the Great Seven. Alexander the First, like Sesostris, inherited an incomparable army and very able generals from great fathers, Philip of Macedon and Amenophis III. In a large measure the same was the case with Frederic. Napoleon

Bonaparte received into his control "the magic sword of the Revolution, which would cut in the hands of any one, would cut of itself," veteran troops and officers inspired with the loftiest enthusiasm, highest ambition, perfect confidence in themselves and their cause. Cæsar, who almost touches Hannibal in the exceeding altitude of his powerful individuality, was certainly the architect of his own fortunes; but then he had Rome's constant, courageous commonwealth behind him, its resources, administration, armament, as a basis, as a reinforcement and as a reserve. Hannibal had to make and remake his armies; to supply them from the word "Go"; to exchange their imperfect arms for better; to find, extract, and supply food, in fact, everything needed to the moment and occasion. No greater commander or citizen, soldier, or Soffete (civil-executive) ever lived. Gustavus, like Frederic, was a wise, despotic king, and a great general. Neither Hannibal nor the "modern Hannibal," Torstenson, were kings, but simply servants of states, the one niggardly from policy or politics, the other from poverty; both had to crush mutinies once and for all, to organize their forces, and reorganize forces as fast as they were expended. How Hannibal ruled with such perfectness is an enigma, unsolved and unsolvable. His secret died with him. How Torstenson administered and carried on war is a problem which has puzzled experts, and none as yet have found the demonstration of it, or to the investigation of his system and campaigns have been able to append the triumphant Q. E. D.

Restricted, as it seems I am always to be, as to the space accorded, and at times for preparation,—for it takes more time to condense than to conceive, it is necessary to confine the attention to certain considerations which are undoubtedly the least known. First, the slaughter upon the battle-field, enormous as it was, sinks into insignificance before the depopulation occasioned by absolute murder, through famine, and through consequent endemic and epidemic diseases. The second matter of astonishment is the enormous sums of money, almost inconceivable when added up, squeezed out of the country, day by day, month by month, year by year, and, sometimes, more than once a day, by successive visitations of armed extortion and civil requisition. Writers stand appalled at the vast contributions levied by Wallenstein, and argue against fact, that the figures are incorrect. Conceding, however, that mistakes may have been made, he was only one of many who robbed systematically. He *acquired* millions for himself when a silver dollar had a purchasing value equal to a double-eagle to-day and *required* millions to maintain his tens of thousands of wolves, who were always hungering and never satisfied. Banér, who is not generally charged with cupidity, left a fortune of Rx. 1,000.000, equivalent to at least $10,000,000 of to-day, and after twenty-eight years of this plundering, Wrangel looted a single town to the extent of Rx. 4,000,000, which is said to have represented an equivalent within the present century of $40,000,000. All this goes to prove what immense hoards derived from industry, economy, and even parsimony must have been piling up in the countries thus raided for thirty years, which had not only to pay for raising, paying, maintaining, supplying, and rewarding vast native armies but the successive invasions of Danes, Spaniards, Swedes, French, Transylvanians, Cossacks, and other barbarians who either temporarily or continuously occupied one or another portion of Germany, and shot through it to and fro like a shuttle through the warp.

Third, the armies of this war, however small in comparison with the armies of the present century, were like the small body of the Octopus in comparison to the mass and extent of its tentacles and their powers of injury to a peaceable population. They resembled Eastern armaments in which the fighting force is to the servants and camp-followers as the meat of the peach-pit to the fruit itself. Even under the administration of Gustavus, while Swedish discipline was at its best, and loose women were prohibited, soldiers were permitted to have their wives and children in the camp, so that the number of mouths to be fed almost exceeds belief. Afterwards when morality ceased to be a consideration, loose women were tolerated to an almost inconceivable extent. Brigaded under a regular hierarchy of control, and according to regulated grades of respectability, there was no such thing as shame about it. It was recognized and regulated, and those who are curious on the subject will find ample information in Freytag's "Vergangenheit," and in technical treatises on army life and administration of the period. The Germans were bad enough, and the French worse, but the Spaniards almost inconceivably bad, with this difference that sometimes in a playful mood they ripped up the unfortunates supplied to them. In the latter years of the war, the armies resembled migratory Tartar hordes.[8]

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[8] Between the armies of the Thirty Years' War—in fact, all the armies of that and previous wars subsequent to the decay of Roman discipline, with the exception of the Swedish and English, proper, and those of the present era—one great difference presents itself. The former were accompanied into the field by not only wives and mistresses, but children, and worse characters of both sexes. Sometimes the number of effectives in a regiment scarcely exceeded that of the women attached to or dependent upon them. In 1620, when a regiment, newly raised, started out from the place where it was "mustered in," it numbered three thousand men and two thousand females.

In the last decade of the war, the camp-followers rose to threefold and fourfold the numbers of those who bore arms regularly. Freytag in his "Vergangenheit" presents a startling picture of this condition of affairs.

As an instance of this constitution of an army, worthy of the days of Xerxes, at Susmarshausen, the strength of the Imperial army, proper, was thirty-three thousand eight hundred soldiers, whereas that of the women, children, and camp-

To sum up the whole matter, the literature of the Thirty Years' War is as worthy of study as the incidents of which it treats are full

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followers reached the startling number of one hundred and twenty-seven thousand. General Gronsfeld writes, 31st March, 1648, that in the two armies (Imperialist and Bavarian) there were certainly more than one hundred and eighty thousand men, women, and children; . . . provisions were issued for forty thousand every twenty-four hours; how the remaining one hundred and forty thousand persons were to live [except by robbery] passed his comprehension." Even as early as 1632, when Wallenstein advanced against Nuremberg, his march was closed by upwards of four thousand wagons,—fifteen thousand women,—according to the estimate of Burgos; and that chronicler supposes the number of sutlers and servants to have been nearly equal (King, 180). Such an aggregation made the march of an army nothing better than a visitation of locusts, with the difference in favor of the insects, since the latter confined their consumption to the vegetation, which was bad enough, whereas these human hordes consumed or carried off everything else. In a few days a comparatively comfortable district with its private or farm dwellings, steadings, outbuildings, etc., etc., would be converted into a perfect waste, just as it is stated that an invading column in 1780 entered the Schoharie and Mohawk valleys—then for the period well settled and cultivated—and, after it marched off, left nothing but the soil and ashes and stone walls to mark where buildings had stood.

Such a state of things has always been common in Eastern countries, even down to the present day.

"It is related by the monks that so sure were they [the Spanish-Saracens] of success and of subduing the whole country [France] that it appeared as if the Moslem army of occupation [which was defeated at Tours by Charles Martel, 3d–4th October, A.D. 732] had come to stay permanently, for they brought with them their wives and childen, flocks and herds, and all their belongings. It was an invasion with a purpose."

For instance, in April, 1799, the English General Harris, in addition to his thirty-five thousand fighting force, was accompanied by one hundred and twenty thousand non-combatants. The proportion of the latter in Asiatic armies, as a rule, has always been at least four ineffectives to each real effective fighting unit. ("Famous and Decisive Battles," by Capt. Charles King, U.S.A., page 180.)

"At the present" (Brockelhurst "Mexico To-Day" 1883, p. 256) "the Mexican army, twenty-five thousand strong, has no commissariat; *crowds of women* follow the troops wherever they move, and provide the soldiers with food."

It was such an Imperial and Bavarian horde of mingled iron and clay of over one hundred and sixty thousand human beings of both sexes and of all conditions that the Allies, Swedes, French, and Associate Germans—doubtless themselves very much encumbered with useless adjuncts—caught *in flagrante delicto* astraddle of the small but not fordable river Zusam. In this affair Z(S)USMARSHAUSEN, the Imperial general, Melander, or Holzapfel, very much resembled a man who goes out to shear and comes back shorn, or starts out to hunt a bear and is hunted instead and hugged to death. The river Zusam, in this district, continually winds like an *s* or *S* or S.

To cover Augsburg, Melander had sufficient strategy to perceive the best position to be assumed to protect the passage of the Danube, was at Zusmarshausen. Suddenly he heard the Allies were about to cross the river at Lauingen farther up, and instead of remaining quiet at a central point to observe and strike, he marched off to Glottwang. Finding at that place that he had been misinformed, and that of interest and instruction. "There were giants in those days." As statesmen, Oxenstiern and Richelieu have never been surpassed. The

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instead of catching the Allies napping—as Grant expected to surprise the Rebels on the morning of the 26th April, 1862, at Shiloh (as Browne says, page 187, in his "Four Years in Secessia")—he was himself surprised.[*]

Discovering his mistake too late, Melander hurried back to Z(S)usmarshausen and got half his army across the Zusam when Wrangel and Turenne were upon him, catching him "astraddle of the fence," just as Lee might have occasioned fearful losses to Burnside, while falling back across the Rappahannock, after Fredricksburg 1st, in December, 1862, and Meade should, at least, have caught Lee at Williamsport and Falling Waters, in July, 1863, and again at the Rappahannock, in the autumn of the same year. Gronsfeld with his Bavarians were just about across when Melander galloped back to the rear-guard to make some dispositions to arrest disorder and strive to avert defeat. As he reached the scene of confusion, Montecuculi's cavalry were just routed, and the other troops became "clubbed" and driven *en masse* without his being able to effect anything to restore order among former, Pope Urban VIII.—an able man himself—regarded as a being superior in degree to humanity. Under some aspects, he was one of the most extraordinary men that ever lived. After the death of Gustavus, he had to pilot the ship of state amid reefs and shoals and swift tides and eddies almost equal to whirlpools. He conned the craft safely through. After Nordlingen, he was in command of the same vessel, dismasted amid a cyclone, and he brought it triumphantly into port. No prime minister ever had a harder task. Œdipus himself was not called upon to solve, to ordinary experience, a more unsolvable riddle. Salvius, another Swedish representative, was pitted against the greatest diplomatists of Europe and carried his points. As to the generals they have been sufficiently dwelt upon. They were worthy children of Thor, the ideal leader of the Northern races; perhaps one of the few mortals justly deified by superstition, if apotheosis could be justified in any case. The "Theatrum Europæum," equivalent to one of our finest illustrated periodicals, is a marvel of painstaking collaboration. It is the copious source of every sort of information in regard to the period.

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[*] Quite a number of battles in the course of the world's history, resemble this last collision of importance at Z(S)usmarshausen during the Thirty Years' War, in more than one of its phases.

The first and most remarkable is Timoleon's victory at the Crimessus, in Sicily, B.C. 343; when the good and great Greek, with about 10,000 men, defeated some 70,000 Carthaginian mercenaries. This overthrow, due to a variety of circumstances, all traceable to natural causes, seems scarcely less miraculous than the discomfiture of the host of Midian by Gideon, or that of the army of Mesha, King of Moab, by King Jehoshaphat of Judah, and Jehoram of Israel; if the facts of these cases could be laid open to critical investigation. They were due to panics to which all ancient and Eastern armies are subject.

Are they more remarkable than Marathon, B.C. 490, achieved in the face of day; or Hemmingsted, A.D. 1500, in the Ditmarsh district of Denmark, by a mere handful of brave peasants, over a Royal army of 30,000; or Narva, 30th November, 1700, when 8000 Swedes under Charles XII., advancing in the face of a snowstorm and a numerous artillery, defeated 80,000 Russians in an entrenched camp, garnished with 150 guns? What is to be said of the "Castlebar Races," 1796, or as to Plattsburgh, 11th October, 1814? On the latter occasion between 12 and 14,000 British veterans, fresh from their glories under Wellington in Spain, after defeating superior numbers of veteran French under Napoleon's ablest lieutenants, abandoned field and fame and wounded, in the face of a few American regulars and not over three thousand militia, almost without cover. In the Class of Battles to which Z(s)usmarshausen belongs, may be included in some respects more or less resemblant, the Persians at the Zaab, after Arbela, B.C. 331; Hannibal's victory at the Trebbia, B.C. 218; (Evesham, 1265, "Art of War in the Middle Ages," 52?) Wallace at Sterling on the Tweed, 1298; Bloreheath, Stafford Co., England, 1459, (See "Art of War in the Middle Ages," p. 120), exactly as to principle; ("Drowning of the Hungarians after the Battle of the White Mountain," 1620) Prince Eugene's utter defeat of the Turks at Zenta, on the Theiss, Hungary, 1696, after Pultowa, 8th July, 1708.

Sobieski's victories on the Plain of Nimiron, in Gallicia, whence he drove the Turks across the Dniester, Stryi, and Schewitz, 1672; Suworrow's Rymnik; Blenheim on the French right, 1704 (Oudmarde might have been made a partial or complete *disaster*, to the Allies while crossing the Schelde, 11th July, 1708, if the French had had a general of any real ability at their head), Campo Santo, 8th February, 1743; Ratisbon, 1809; Aspern, 1809; Beresina, 1812; Katsbach, 1813; Leipsic, after the conclusion of the last of the Three days' "Battle of the Nations," 1813; Ostrolenka, Poland, 26th May, 1832. A number of other instances might be added did time permit their consideration.

Our "Rebellion Record" was conceived with the same idea, but is as inferior in comparison in value as copper to gold. The battle and siege plans in the "Theatrum" are unique. Without them nothing would be known trustworthily of any of the important collisions and sieges. The maps for the period are excellent. Chemnitz and a few other writers constitute the authorities to which every historian must resort. Without them, any one attempting to write on this war would be a

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the Imperial regiments, proper, or hold them up to their work. The Elector of Bavaria subsequently charged certain of their Colonels with cowardice. At this juncture, a bullet struck Melander in the body, and with a last exhortation to his broken troops, he fell mortally wounded from his saddle.

It was here almost as it was to be at Aughrim, 1689, after St. Ruth was killed. All was inevitably lost there, before Sarsfield (Lord Lucan) could gather up the reins of command. Gronsfeld, who had gotten across with almost all the Bavarians, posted them to defend the river, but soon discovered that unless he destroyed the bridge his own force would be annihilated as well as the other half of the army, the Imperialists, who were still on the west shore. It was a type in 1648 of what occurred at Leipsic in 1813. The premature destruction of the bridge and the subsequent heroic resistance of Ulric Würtemberg, saved a portion of the Imperial army, but delivered up the rest to the swords of the Allies. The result of this German (1648) Little Sailor's Creek of (6th April, 1865), delivered over Bavaria to the invader, and they made the most of their victory. Just as the sovereign and Elector Maximilian abandoned his dominions and subjects to the Swedes under Gustavus Adolphus, in 1632, just so, again, he repeated his flight to Salzburg, the capital of the Archbishopric of that name, leaving everything a prey to the irruption which his own duplicity, bigotry, and cruelty had brought thus again and again upon his unhappy people.

mariner at sea without compass and charts. As a study for everything but strategy—which was, perhaps, precluded by circumstances—for grand tactics, for tactics, for logistics, in the most comprehensive sense, for demand and supply, for marches, for everything pertaining to the carrying on of war, the raising of armies, the feeding, the furnishing, and the fighting them, there are no such lessons to be learned from any similar term of years as from 1620 to 1648. After the peace of Westphalia (1648), war continued, here or there, almost without cessation, but there was very little scientific improvement until the time of Frederic the Great; and although enormous armies were brought into the field, until the great Hohenzollern arose, science was under an eclipse. In his strategical acuteness of vision Napoleon ranked very high, but in no other way. To him cannot be traced a single step in advance, such as characterize the daybreak of Gustavus and of Frederic. It may seem almost a paradox to conclude with an assertion so startling as this which follows: the four years of the great American contest for the suppression of "the Slaveholders' Rebellion," developed more novelties in the combination and applications of the sciences and arts of peace as coadjutors to the arts and sciences of war, demonstrating that the useful may be made the handmaid of destruction and invention, the best servants of force, than any like period of hostilities in the history of the world. With the impetus then and there given, war entered as to tactics, arms, and everything inseparably connected with it, into, as it were, a new plane of existence.

That the views expressed in this article have been strongly corroborated, can be proved from recent works which have appeared of late years since different national archives were thrown open to investigation; Professor Ward in his Lectures on the "House of Austria in the Thirty Years' War," and Koch's "History of the German Empire during the Reign of Ferdinand III.," etc. It is only very lately that historians have appeared, who were not absolute champions of the religious doctrines they professed. With the abating of intolerance, due rather to skepticism or indifference than to charity, truth has come to the front.

Professor Ward is very clear and very just, although he does deal slashing blows to those who deserve it. Towards Wallenstein he is in so far just, in that he shows that in getting rid of him, his only great general, the emperor committed the *great* error which gave to the enemies of his realm and religion, victory in the end; that Wallenstein understood Gustavus Adolphus, and that the Swedish hero was by him, "the Friedlander," drawn away from his own plans to act as Wallenstein intended. As to Gustavus, Ward makes it clear that, from the first, he intended to have a hand in the German war; whatever may have been the original impulse or extent of his aims, "Gustavus Adolphus—of this there remains no doubt—aspired to no less a prize than the Imperial crown." "The sack of Magdeburg—which, even were its captors freed from every stain of criminality, would remain a monstrous political blunder—threw Saxony into his arms; the victory of Breitenfeld placed the fate of the empire in his power. *Then, had he marched upon Vienna, it must have fallen.* And so must the same city have fallen into the hands of the victors of Sadowa, and so must Rome into those of Hannibal after Cannæ. But, whatever we may think of the Prussians of our own day, neither Hannibal nor Gustavus were politicians of the event." The first complaint of Gustavus against Ferdinand III., the exclusion of his ambassador from the conferences at Lubec, was a manufactured grievance. "The object of Gustavus Adolphus was obviously to be insulted." The cases of his representative and that of Benjamin Franklin were identical. Both were treated most disrespectfully, Salvius by the Imperial Commissioners, Franklin by the English Ministers, and both lived to play a principal part in the humiliation of the powers to whom they were previously objects of discourtesy almost amounting to contempt.

Koch is the first historian who gives a fair account of this conflict at *Susmarshausen*, which is generally styled no better than a bloody skirmish, and is more worthy the title of a battle than most engagements which are classed as such. In a measure he excuses Melander, and shows that the fighting lasted over nine hours and was lively and bloody, adding that Melander's career had an unfortunate but glorious termination. Considering the fact that this general was a rigid Calvinist, and that a bigoted Romanist emperor made him commander-in-chief of his army, is excellent proof that he must have possessed and displayed unusual military ability, which by one historian at least has been claimed for him.

THE ACTUAL AND OSTENSIBLE CONDITION OF THE RUSSIAN CAVALRY.

By H. VON DEWALL, Rittmeister *à la suite* of the Old Mark Ulan Regiment No. 16, instructor at the Military School, Potsdam.

(Translated from the *Jahrbücher für die Deutsche Armee und Marine* by STANISLAUS REMAK, late First Lieutenant Fifth U. S. Artillery.)

It will be remembered how animated a discussion was maintained not long ago in daily and technical periodicals with regard to the question whether, in the event of a war with Russia, the menacing of our Eastern frontiers or even an interference with our arrangements for mobilization might be efficiently warded off, inasmuch as the Russian cavalry could pour itself forth upon East and West Prussia, as well as over Silesia, before we could make suitable dispositions to prevent it.

The Russian cavalry possesses an organization similar to our own in so far, in that in a condition of peace it closely approximates its war strength; so that independently of the period requisite for the instruction of recruits, it is enabled to leave its garrisons in a few days,—in part, perhaps even in a few hours. In a certain sense, it has, indeed, an advantage, as compared with ours, as the dispositions with regard to its assignment and incorporation, necessary in war and especially for the purposes of the great operations, are already met in a state of peace. When we moreover bear in mind that the great majority of its divisions are distributed in the Western provinces, in part in the very frontier territories, while the remainder are suitably located along the railway lines, the significance of the question above propounded will appear in no degree lessened and a ready explanation will be found of the fact that a keen eye is kept on the part of the Germans upon the Russian cavalry, which, quite regardless of its tactically cavaleristic[1] value or the want of it, is calculated, in view of its great masses alone, to play an important part in future wars. That this part was not a conspicuously prominent one in the last Turkish war, is due to circumstances, the more detailed explanation of which would lead us beyond the purport of this paper; but the plains of the Vistula and the Niemen are conducive, in other fashion than the mountainous regions of the Balkan peninsula, to the active participation of the mounted troops in the great battles, in which it may be demonstrated that the cavalry can yet coöperate in the achievement of decisive results there, as well as in the service of the strategical operations before and after. If anywhere, the Russian cavalry can there demonstrate what it can achieve; if the aims, which it has heretofore affected and still affects, be the correct ones, and if the expectations at the present time formed of it by the people and by the leaders of the Russian armies, be justified. *There* will the greatest masses of horsemen in the world contend with one another; *there* will be found the opportunity to bring our ancient knightly arm anew in good stead, to show that without it the great armies of the present era are inadequate colossi and not only that, but also to prove to the dismayed infantry, that the breech-loader can yet be conquered, if only the cavalry shall have remained as of yore and shall ground its attacks upon those principles, which aforetime have been taught us under the ægis of the great Frederick, by a Seydlitz and a Zieten. The time of peace and inactivity, which ensued after that period of highest fame, cannot be to us a sign of incipient relaxation, but only a time of collected deliberate readiness and expectation. The ban is now broken, that rested upon us. This is the avowed tactical creed of the *German* cavalryman!

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[1] The word is adopted from the original. Repeatedly employed in the further progress of the article, it carries within itself its meaning, which could not otherwise be rendered without a somewhat labored circumlocution; nor then always, without detriment to the adequate forcibility of expression of the precise thought intended to be conveyed.—TRANSLATOR.

And the Russian? He boasts of his numbers and relies—he, the trooper,—upon his musket! The numbers, yes, these are considerable; doubly as great as ours! But are these masses, over whom he holds sway, filled with the same spirit, which is solicitously nourished and cherished in our horsemen? Were this the case, the solution of a knotty problem would undoubtedly stand in our way. But it is not so and cannot be so, if horse and sabre and lance are to be made subservient to, nay, are to give way to, the fire-arm.

Already as long ago as at the time of the Franco-German war, a revolution became manifest in Russia in the views upon the employment of the cavalry; the experience, which it was thought had been gained in the conflict with the Turks, gave this new impulse; the possibility of the practical success of cavalry attacks against the fire-arms of the day appeared to be beset with perplexing doubts; and continually greater and greater force was acquired by the tendency to gravitate towards the belief, that the fire-arm alone could restore to the cavalry what it had lost—*i.e.*, that it could only yet hope to operate with unqualified success if the rapidity of the horse were united with the readiness of fire of the infantry and that, therefore, these two desirable elements must be incorporated with one another. Thus all these years are filled up with a succession of important changes in organization, which constantly tended to deprive the cavalry regiments of their character as regiments of horsemen and sought to remodel them into a body of troops, which should be in the position of rivaling the infantry, but which, in the natural order of things, in proportion to the growth of confidence in their rifles, were bound to suffer in cavaleristic peculiarities. With the transformation of the regiments of ulans and hussars, attached to the fourteen European cavalry divisions, into dragoons,[2] which ensued after the close of the autumn manœuvres of 1882, this labor of re-organization came to a close for the time being, and it was hoped that now, at last, a body of cavalry adapted to present demands had been secured.

From this alone we would be already enabled to determine the spirit with which it is proposed in the future to cause the cavalry to be indoctrinated. For the Russian dragoons had for years aimed to achieve preëminent efficiency in fighting on foot; they even seek with a sort of pride, to all appearance, to render the cavaleristic element itself, of ulterior account. But the best evidence of the ideas entertained by the Russian authorities as to the future sphere of action of the cavalry, appears from the fact that a similar armament and employment is also contemplated for the Cossack regiments; so that, when this transformation shall have been completed, the existence in Russia of a body of actual cavalry, fighting with sabre and lance, will scarcely be any longer in question.

The Russian cavalry, it will be remembered, is divided into:

I. The regiments of the regular cavalry (cavalry of the guard and army);

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[2] We are indebted for a portion of our observations to a work which has recently appeared and which seems to us worthy of the widest dissemination: "The strategical cavalry manœuvres under General Gurko in Southern Russia, in the fall of 1882, and the reform tendencies in the Russian cavalry, By A. von Drygalski" (R. Eisenschmidt, Berlin). Owing to the difficulties, consequent upon the lack of knowledge of the Russian language, the few literary productions upon the army institutions of Russia which come into the world, must be doubly welcomed, especially when written, as in the case of the work above mentioned, from the critical point of view of the professional soldier. While the first part of the book gives a clear description of those strategical manœuvres, which is interesting in itself, he who seeks instruction upon the spirit now animating our comrades-at-arms over there, will be amply rewarded by studying the second part of it, designated "reform tendencies."

II. The Cossack regiments, } which in time of peace are
III. The so-called irregular troops, } only in part organized.

I. Of **regular cavalry**, since the before-mentioned re-organization, there are:

4 regiments of cuirassiers of the guard,
2 " " dragoons " " "
2 " " ulans " " "
2 " " hussars " " "
46 " " dragoons " " army.

Total, 56 regiments of cavalry, consisting of 2 divisions, of 2 squadrons, each,	= 224 squadrons.[3]
To which is to be added: the Crim Tartary division, consisting of 2 (in time of war 4) squadrons,	= 4 "
which in certain respects belongs to this enumeration.	
Total, in time of war, 57 regiments	= 228 squadrons.

Independently of insignificant differences, the strength of each of these organizations on a war footing, is: 31 officers, 48 non-commissioned officers, 17 trumpeters, 512 men[4] = 608 combatants. These 57 regiments have, therefore, a war strength of 34,656 combatants.

II. Of **Cossacks** there are, *i.e.* are newly organized in war:

(*a*) THE DON COSSACK WOISKO.

In peace are present:	
The combined Don Cossack regiment (body guard), consisting of 4 squadrons	= 4 squadrons.
15 Don Cossack regiments (army), first category = 15 regiments, consisting each of 6 sotnias	= 90 sotnias.
Carried forward	94 squadrons and sotnias.

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[3] The fifth squadrons serve as reserve squadrons and are so named even in time of peace; they are disregarded in the above calculation.

[4] Presumably intended to include corporals, who in the Russian army do not attain to the rank of non-commissioned officers.—TRANSLATOR.

Brought forward			94 squadrons and sotnias.
Newly organized in war:			
The Don Cossack regiment (body guard), consisting of	formed out of the combined Don Cossack regiment (body guard), of the peace footing.	6 squadrons =	6 squadrons.
The Ataman Cossack regiment (body guard) consisting of		6 " =	6 "
15 Don Cossack regiments, (army), second category, consisting each of 6 sotnias		=	90 sotnias.
30 independent sotnias, second category,		=	30 "
15 Don Cossack regiments, (army), third category, consisting each of 6 sotnias		=	90 "
Total, 52 regiments, consisting of			316 squadrons and sotnias.

The war footing of these organizations is:

The Don Cossack regiment, (body guard), 53 officers, 96 non-commissioned officers, 25 trumpeters, 960 men = 1134 combatants	1134	combatants.
The Ataman Cossack regiment, (body guard), has apparently the same war footing = 1134 combatants	1134	"
The Don Cossack regiments, (army), 21 officers, 86 non-commissioned officers, 19 trumpeters, 686 men, each = 812 combatants; in all:	40,600	"
War strength of the Don Cossack Woisko:	42,868	combatants.

(*b*) THE KUBAN COSSACK WOISKO.

In peace are present:

2 squadrons, His Majesty's convoy	=	2 squadrons.
10 regiments of horse, of 6 sotnias each	=	60 sotnias.
1 division of horse, of 2 squadrons	=	2 squadrons.
Carried forward		64 squadrons and sotnias.

Brought forward — 64 squadrons and sotnias.

Newly organized in war:
- 20 regiments of horse, second and third categories, of 6 sotnias each = 120 sotnias.

Total 30⅔ regiments = 184 squadrons and sotnias.

Their war footing is:

The squadrons of the convoy, 6 officers, 18 non-commissioned officers, 2 trumpeters, 160 men, each = 186 combatants; in all	372 combatants.
The Kuban Cossack regiments of horse, 23 officers, 86 non-commissioned officers, 13 trumpeters, 768 men, each = 890 combatants; in all	26,700 "
The Kuban Cossack division of horse, 11 officers, 18 non-commissioned officers, 7 trumpeters, 266 men = 302 combatants,	= 302 "

War strength of the Kuban Cossack Woisko: 27,374 combatants.

(The squadrons of the convoy are detached from the Woisko in time of war, but are counted in the above enumeration to arrive at the total strength.)

(c) THE TEREK COSSACK WOISKO.

In peace are present:
- 2 squadrons, His Majesty's convoy = 2 squadrons.
- 4 regiments of horse, of 4 sotnias each = 16 sotnias.

Newly organized in war:
- 8 regiments of horse, second and third categories, of 4 sotnias each = 32 "

Total 12½ regiments = 50 squadrons and sotnias.

Their war footing is:

The squadrons of the convoy, 6 officers, 18 non-commissioned officers, 2 trumpeters, 160 men, each = 186 combatants; in all	372 combatants.
Carried forward	372 combatants.

Brought forward 372 combatants.
The regiments of horse, 17 officers, 58 non-commissioned officers, 9 trumpeters, 512 men, each = 596 combatants; in all 7152 "

War strength of the Terek Cossack Woisko: 7524 combatants.
(The squadrons of the convoy are detached from the Woisko in time of war.)

(*d*) THE ASTRACHAN COSSACK WOISKO.[5]

Total, 3 regiments = 12 sotnias.
War strength of the Astrachan Cossack Woisko: 1782 combatants.

(*e*) THE ORENBURG COSSACK WOISKO.[5]

Total, 18 regiments of horse = 108 sotnias.
War strength of the Orenburg Cossack Woisko: 16,488 combatants.

(*f*) THE URAL COSSACK WOISKO.[5]

Total, $7\frac{2}{3}$ regiments = 46 squadrons and sotnias.
War strength of the Ural Cossack Woisko: 7059 combatants.

(*g*) THE SIBERIAN COSSACK WOISKO.[5]

Total, 9 regiments = 54 sotnias.
War strength of the Siberian Cossack Woisko: 8190 combatants.

(*h*) THE SEMIRJETSCHENSK COSSACK WOISKO.[5]

Total, 3 regiments = 12 sotnias.
War strength of the Semirjetschensk Cossack Woisko: 1842 combatants.

(*i*) THE TRANS-BAIKAL COSSACK WOISKO.[5]

Total, 3 regiments, = 18 sotnias.
War strength of the Trans-Baikal Cossack Woisko: 2676 combatants.

(*k*) THE AMUR COSSACK WOISKO.[5]

Total = 1 regiment of 6 sotnias.
War strength of the Amur Cossack Woisko: 910 combatants.

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[5] The detailed enumeration of the original in the case of these Woiskos has been omitted for want of space.—TRANSLATOR.

III. Of irregular troops, which though so called, have also a fixed status, and are to be newly organized in war, there are:

	Officers.	N.-C. Officers.	Trumpeters.	Men.		Combatants.
1. 1 Sotnia in Irkutsk.						
War strength	6	12	1	120	=	139
2. 1 Sotnia in Kravsnojarsk.						
War strength	6	12	1	120	=	139
3. 2 Ussuri sotnias.						
War strength	5	9	3	133	=	300
4. The Kutais irregular regiment of horse of 4 sotnias.						
War strength	23	30	...	600	=	653
5. Standing militia.						
1 Kuban sotnia.						
War strength	1	7(?)	...(?)	80	=	88
11 Terek sotnias muster	22	66(?)	...(?)	1177	—	1265
11 Daghestan sotnias muster . .	22	66(?)	...(?)	975	=	1063
Ssuchum guard (1 sotnia).						
War strength	...(?)	10(?)	...(?)	160	=	170

War strength of the irregular troops: 32 sotnias with 3817 combatants.

To these are to be further added those unenumerated thousands, available for organization in case of need out of the multitude of men and horses, of whose sum however, it is impossible to make a calculation, or even an estimate.

If, therefore, all these organizations come into existence in time of war, Russia would be able to bring into the field of cavalry:

1. The cavalry of the guard and army, including the Crim Tartary division . . .	57 Regts.	=	228	Squads.	with	34,565	Combts.
2. The Don Cossack Woisko . .	52	"	= 312	Sotnias,	"	42,368	"
3. " Kuban " " . .	30⅔	"	= 184	"	"	27,374	"
4. " Terek " " . .	12½	"	= 50	"	"	7,524	"
5. " Astrachan Cossack Woisko	3	"	= 12	"	"	1,782	"
6. " Orenburg " " .	18	"	= 108	"	"	16,488	"
7. " Ural " " .	7⅔	"	= 46	"	"	7,059	"
8. " Siberian " " .	9	"	= 54	"	"	8,190	"
9. " Semirjetschensk Cossack Woisko	3	"	= 12	"	"	1,842	"
10. " Trans-Baikal Cossack Woisko	3	"	= 18	"	"	2,676	"
11. " Amur Cossack Woisko .	1	"	= 6	"	"	910	"
12. " Irregular troops . .	?	"	= 32	"	"	3,817	"
Aggregate strength .	196⅚ regts.	=	1062	squadrons & sotnias.		155,186	combts.

These are, it must be confessed, significant numbers, as compared with which our 93 regiments with their 57,939 combatants (counting 23 officers and 600 men to the regiment), would have a hard struggle, if numbers were anything else than—numbers. By themselves they as yet prove nothing. Of what use to the Russians are these 155,000 horses, if they cannot be made available in good time? Even if the Russian regiments could be recruited up to the full standard as rapidly as the German, it would be impossible, in view of the colossal dimensions of the Russian realm, and in spite of the railways, to forward them to their destinations before the lapse of months. No proof is needed of this. Without going back further than to recent times, we know that in the Crimean war, as also in that against Turkey, Russia has had to suffer from the impossibility of accomplishing a timely union of her combatant forces. The former came to an unsuccessful issue, principally in consequence of these causes. Russia, though immeasurably superior to the allies in combatant strength, was powerless to effect the transportation of her forces before the decisive moment. It was the same in 1877 and 1878, and so it will be for a long time to come, in future wars. To accomplish with adequate dispatch the junction on the frontier of military organizations like the Russian, will remain a difficult, and perhaps, indeed, an insoluble problem, even if Russia shall be, some day, traversed by a widely disseminated railway system, answering the demands of military necessity.

There can, however, be no question as to a recruitment of the Russian cavalry to its war strength, as rapid as that of our own, when we recollect that large parts of the regiments of Cossacks and of horse, and notably all those which are not regularly organized except for war, belong to the second and third categories. It is true that the troops of the second category are not only armed and equipped in time of peace, but have also their horses; but the troops of the third category are prepared with their armament and equipment alone and have no horses. Thus, the regiments of the latter category may be primarily left entirely out of consideration, and even those of the second category will in all cases require a certain time,—perhaps several weeks,—before the completion of their formation and before they shall be ready to march. In so far as can be predicated, therefore, there would, under any circumstances, be no question as to a transportation of these latter organizations, until the march to the field of the regular army of operations should have been accomplished. We, for the time being, would consequently not have to concern ourselves even as to the regiments of the second category. Those who know what it means to push forward an army of so and so many hundred thousand men into the field, on four railway lines, and to make all the dispositions for their current and eventual wants and subsistence, will perceive, without the necessity for the exhibition of detailed calculations, that there can be neither time nor room for following them up at a very early day, by the dispatching of further masses of troops. Russia does not, at the time, possess more through railway lines than these, in which is already included that leading out of her Southern provinces, from Charkow, by way of Balta, to Lemberg, on the Austrian frontier. From its terminus, Dubno, the troops would have before them to the Prussian frontier, a distance of 460 versts = 305 English miles in an air-line, that is to say, a march of about four weeks.

For immediate employment Russia has only those regiments which are already formed in time of peace. The remainder will furnish, it must be admitted, a highly respectable reserve, increasing in importance the longer the war may continue, and the more impaired in strength our own cavalry, which cannot command equally powerful second and third lines, may become. At the outstart, however, these regiments may be disregarded as having any bearing on the strategical development of the campaign, upon the issue of which they could exert no appreciable influence, perhaps for months.

Bearing in mind the foregoing remarks, we will perceive that Russia has organized in time of peace 504 squadrons and sotnias, with a war strength of 77,001 combatants. And even from this number deductions must be made. As the combined Don Cossack regiment of the body-guard is to serve as a nucleus for the two Cossack regiments of the body-guard of the Don Cossack Woisko to be formed in case of war, it can scarcely be assumed, if a systematic mobilization be had, that it will move into the field with the regiments of the first category; but on the contrary that, in all probability, it will not do so until the completion of the organization of these two regiments, that is to say, with the second line. In the same way the irregular troops, taking into consideration their constitution and organization, appear little adapted to be brought into immediate service. Altogether, then, there would be 4,575 combatants, which may well be deducted from those 77,001; so that the actual strength of Russian cavalry moving into the field at the outbreak of a war would amount to 72,426 as against our 57,939 men. It is true, it cannot be presumed that these figures are infallibly correct, as they are not directly taken from official sources, but depend essentially upon the statements made in the latest yearly issues of the "Yearly reports upon the changes and progress in military matters." But in reality, a few hundred or thousand men more or less need not be regarded as of consequence in affecting the questions with which we have to do.

All the regiments of the cavalry of the guard and army, as also those of the Don Cossack Woisko and a few of those of the other Woiskos, are attached to permanent cavalry divisions, which are moreover provided with artillery for their support. In *time of peace*, there are of these divisions:

2 cavalry divisions of the guard,
14 " " " " army,
1 Caucasian cavalry division,
2 " Cossack divisions,
1 Don " division.
—
Total, 20 cavalry divisions.

Out of the extraordinarily strong second cavalry division of the guard (seven regiments and one independent squadron), two divisions are formed under an order of mobilization,[6] there being consequently in time of war a total of twenty-one cavalry divisions, consisting each of two brigades (the second cavalry division of the guard, of three brigades), of two regiments, with two horse batteries, each; excepting, however, the cuirassier division of the guard, which then includes the Ural Cossack squadron of the body-guard, and the first Caucasian Cossack division, which numbers five regiments. It should, at the same time, be mentioned that the two Caucasian Cossack divisions have only one battery each.

As, from the point of view of their strength, since Russia, excepting the few regiments of the guard, possesses only dragoons and Cossacks (or, what is, to all purpose, to the same effect, regiments of horse), so also in respect of other constituent elements, do we find a similarity between the various divisions. There are:

The cuirassier division of the guard, composed, as indicated by its designation, of the four cuirassier regiments of the guard and the before-mentioned Ural Cossack squadron of the body-guard.

The first and second cavalry divisions of the guard, composed of the ulan, dragoon, hussar, and Cossack regiments of the guard, equally divided between them.

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[6] To this division belongs the combined Don Cossack regiment of the body-guard, out of which the before-mentioned two regiments are organized in time of war. Thus, unless the division were divided, it would include eight regiments, which would undoubtedly be too many.

The fourteen cavalry divisions of the army, composed, on the other hand, of three dragoon regiments and one of Cossacks, each.

The Caucasian cavalry division, composed of four dragoon regiments.

The three Cossack divisions, composed each of four (the first Caucasian division, of five), Cossack regiments, *i.e.* regiments of horse.

As to the *rôle*, which would be assigned to these divisions, it can be determined with tolerable certainty. It is true, that in time of peace they are attached and united to the army corps in such a manner, that the two divisions of the guard belong to the guard corps; the fourteen cavalry divisions of the army to the army corps Nos. 1–14; the two Caucasian Cossack divisions to the first Caucasian army corps; the Caucasian cavalry division to the second Caucasian army corps; while the Don Cossack division is apparently not assigned to any corps. But from this distribution among the army corps, it by no means follows that this relation is also intended to be kept up in time of war. Rather has the recognition of the necessity for an independent employment of the cavalry, rendered all other considerations of this sort of minor importance, and it exercises such a dominant sway over the entire instruction, organization, and being of the Russian cavalry, that it is to be expected with absolute certainty that, in time of war, the divisions will be assigned to the positions under the potent influence of that doctrine regarded as appropriate to them, which conclusion is also strengthened in view of the permanent assignment of artillery to them.

Now, though we have, to practical intent and primarily, to do only with the before designated available Russian cavalry of the first line, we must not be oblivious of the fact, that those regiments of the second and third categories, with their 82,760 men, are in the rear of the first line, preparing for the fray, and—though it may be a long time—will yet finally reach the front. It will scarcely be maintained, however, that the strategical importance of the cavalry would be of appreciable significance and influence during the first period of the war; let the *rôle* of the German combatant forces become developed in the course of it, how it may, whether as an offensive or defensive one, always will the side that shall be provided with a numerically superior cavalry (equal excellence being pre-supposed) be the better served, and in consequence possess a certain advantage. But that, in such later periods, the Russian cavalry will be numerically stronger is unquestionable and a matter of fact which those may bear in mind for whom our 93 regiments are already too many. It may be urged that the Cossack regiments have no reserve squadrons (such being only formed for the regiments of cavalry of the guard and army); and that, therefore, presumably, portions of the regiments of the third category would have to undertake these functions not only for those of the first, but also for those of the second, category. But with all that, whatever could be pushed forward *with us* in the way of reserves, would be of inappreciable account in comparison with the masses which would appear from the interior of Russia. In 1870 it was repeatedly demonstrated that our reserve squadrons could scarcely, nor in adequate time, cover the more serious losses,—and over there, there are 80,000 fighting men moving forward into the first line!

Herewith we have to a certain extent a definite notion as to the numbers with which we are concerned in regard to the Russian cavalry. But with no arm do numbers alone amount to so little, and in order to arrive at an approximately correct judgment as to the value of the Russian cavalry, it is first of all necessary to examine more closely the fundamental principles, which underlie its equipment and armament, its instruction and employment.

While formerly the cavalry of the guard and army was exclusively mounted upon the quite fairly useful but rather heavy-footed horses of Great Russia, these regiments in later times have also taken the majority of their remounts from the races of the steppes of the Southern provinces. In himself better adapted than any other to military service, by his endurance and tractability, the Cossack horse nevertheless furnishes in his build the type of the lightest imaginable cavalry horse (though in certain aspects the Hungarian may perhaps stand side by side with him); so that in point of fact the Russian cavalry of the present can scarcely be regarded as consisting of other than light regiments. One does not need to be a defender of the heavy cavalry, especially of the cuirassiers, to appreciate that as the mass must ever lend to a *choc* a certain preponderance of weight, the Russian cavalry must in this manner, in view of its system of remounts, fall short in its necessities and that it has little prospect in a closed attack, to withstand an adversary riding towards it upon more powerful horses, well held in hand in consequence of a rational training that ensures obedience and equanimity. And the more especially so, as there is to all appearance scarcely any more question as to artistic equitation in the Russian cavalry. The deer-necked, weak-backed, Cossack horse renders every systematic training well-nigh futile:—short gallop, side-steps, and such; indeed every species of well-executed evolution, upon which, with justice, a high value is placed among us, are with him demands totally impossible of fulfilment. A cavalry in which the spirit for equitation and the art of riding vanishes in the degree, to which it seems to have vanished in the case of the Russian, —such a cavalry must inevitably and simultaneously retrograde in its peculiarly cavaleristic elements. It has known better times, at least the cavalry of the guard and army; its riding-school horsemanship was even quite fair; but, in this respect, its *matériel* in horses is the ruin of it. Let us not deceive ourselves. Over there they have it, that the Russian cavalry with its system of to-day is giving proper importance to field-exercise and true horsemanship, as contradistinguished from the many years wherein that accorded to school-training, on its part dealing a death-blow to the cavaleristic spirit, had been inordinately exaggerated. As to the latter we might be conservative enough to offer to be convinced; but one goes from one extreme to the other. One forgets, that school-training forms the fundamental basis of field-exercise and that where it is proposed to progress by strides to the latter, without leaving to the former the place due it of right, this can only be at the cost of the horses, but above all of horsemanship. Of what use to the Russian cavalry are the races, for which prizes are offered on behalf of the state; of what use the prolonged rides for the testing of endurance, which latterly have come in vogue also in the garrisons; of what use, above all, to the Cossacks, are the various tricks practised, reminding one of the circus,—when, in spite of all, there is total powerlessness, by proper influence upon the horse, to control him in obedience during the attack? These are all things, which might quite gladly be accepted into the scale, after naught should have been found wanting; but they must never be dignified as of primary importance, or as the chief aim to be attained.

Even the equipment of the Russian cavalry horse cannot be conducive to horsemanship, *i.e.*, the art of riding. The peculiar form of the horse's neck appears to necessitate a rein rather lower than common. On the contrary, however, in consequence of the remarkable manner of saddling and packing, the bridle-hand inevitably assumes an abnormally high position. Upon a felt saddle-blanket surmounted with leather, rests the tree and upon this the quadrupli-folded horse-cover, or the schabraque, as the case may be. To the front of the tree there are arranged, as with us, the pouches; at the rear, an overcoat-sack. But as in the latter, there is, with the other respective articles of equipment, no room for the overcoat itself, it has been contrived to find a place for it at the front fork, where, after the fodder-sack has been wrapped around it, it has been fastened over the pouches. When, therefore, in view of the high seat of the rider on the felt saddle-blanket, tree and horse-cover, or tree and schabraque, a satisfactory seat upon the back and in consequence an easy bringing forward of the off hand is scarcely possible, which in certain respects, for that matter, on account of the soft back, may all be very well; so, on the other hand, through this seat and especially through the position of the overcoat, the bridle-hand is proportionately heightened. The result of this is that, as with such a rein the animal cannot be well held in hand, everything contributes in the more rapid gaits to a disorderly, uncontrollable dashing and tearing, while the unnaturally raised attitude and the inadequacy of the off hand impose the whole burden upon the weak back. A peculiar impression is also given by the further loading down of the horse. In a pocket fastened to the felt saddle-blanket, there are, in a similar position as with us, two horseshoes and sixteen nails; on one side of the overcoat-sack hang the cooking utensils. To the rear of the saddle, where with us lies the fodder-sack, hangs on one side a net with hay for two days and on the other side a sack[7] with two days' provender of oats; so that the whole load, inclusive of forage, weighs over one hundred and fifty pounds and the horse has altogether to carry, if we assume the rider, with arms and equipments, to weigh two hundred and ten pounds,[8] some three hundred and sixty pounds.[9] Now let one fancy the cavalryman in the act of mounting his horse, peradventure pursued by the adversary after an unsuccessful attack on foot. True it is, the animal is not large, but how far must the man lift the right leg out of the ball-and-socket joint, to get over the hay net, the overcoat-sack with the cooking utensils and the two days' provender of oats!—With the Cossack regiments, the method of saddling is the same, with slight differences, which are of no especial interest. That the Cossacks ride upon the snaffle and, instead of spurs, carry a whip, is well known.

The armament, also, since the regiments of hussars and ulans have been transformed into dragoons, is, taken all in all, the same in the entire Russian cavalry. While, formerly, the dragoons and Cossacks exclusively were armed with muskets available for fighting on foot, today the whole body of regiments, with insignificant exceptions (the cuirassiers of the guard, etc.) could dismount to the same weapon. Yet this revolution, as has been seen, has been no violent, sudden one. Especially with the dragoons had fighting on foot been regarded with peculiar predilection, as will be notably perceived, if we recollect the corps of dragoons of the tsar Nicholas. Indeed from the very beginning has the Russian cavalry had a certain tendency to attach predominant importance to fighting with the fire-arm in hand; and often it has been said that the cavalry of Peter the Great (dragoons) felt far more in its element on foot than on horse-back. The experience derived from the war of 1870–71, which clearly demonstrated the indubitable necessity of the fire-arm for the cavalry, could only give new impetus to this tendency; as a result the carbine was soon placed in the hands of the second rank of the hussars and ulans. But then even this did not seem to satisfy the increased demands of the case; it was believed that a successful contest by cavalry before the front of armies pre-supposed the possibility that in case of need it should individually possess characteristics enabling it to carry on a brisk combat with fire-arms, and then was brought about that transformation of the twenty-eight regiments of ulans and hussars of the army into dragoons, since which time the entire body of Russian cavalry (excepting the guard) virtually consists only of dragoons and Cossacks. In consequence, as a matter of course, the organization and armament are in keeping with this change; or, these latter have, rather, it should be said (in view of the fact that, as known, the Cossacks had already time out of mind carried the fire-arm in addition to the lance), been throughout adapted to an employment of the cavalry on foot.

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[7] Not to be confounded with the above-named "fodder-sack," the object of which, in addition to this haversack, we further do not quite clearly comprehend.

[8] V. A. v. Drygalski.

[9] About three hundred and seventy-one English pounds.—TRANSLATOR.

Of blank hand-arms all the regiments (the regiments of the guard, army, and of Cossacks) carry the sabre;[10] in addition thereto, the Cossacks and the cuirassiers, ulans, and hussars of the guard, carry the lance. Of fire-arms, the cuirassiers of the guard have exclusively revolvers on the Smith and Wesson system; the ulans and hussars of the guard have, for the first rank and for the non-commissioned officers, the revolver; for the second rank, the carbine on the Berdan system (construction similar to the Berdan infantry musket but of lesser length, the cartridge being the same as for the dragoon musket); the dragoons have for both ranks the dragoon musket provided with a bayonet (!) (Berdan system, but likewise of lesser length; the cartridge the same as that for the infantry musket, but with a weaker charge); and the Cossacks have the same musket but without a bayonet. Of ammunition pursuant to this armament,—taking no account here of the reserve quantum at hand in the trains, etc.,—there are carried: by the cuirassier of the guard, 20 revolver-cartridges; by the hussar and ulan of the guard, 20 revolver- or 20 carbine-cartridges, according to the rank; by the dragoon and Cossack, 40 dragoon musket-cartridges.

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[10] The sabre, similarly as at one time with us the side-musket of the infantry (*e.g.*, the Prussian palace-guard company), is suspended from a bandolier worn over the breast. It thus acquires a quiescent position, which is recognized as a great advantage, while on the other hand, the bandolier interferes with the breathing of the man. It is peculiar, but in certain respects quite ingenious and useful, that the blade is sheathed in a wooden scabbard. By this arrangement the annoying rattling, through which a cavalry regiment betrays itself from afar, even on the softest soil, is intended to be avoided. Eye-witnesses, who are very enthusiastic over this device, picture to us as highly singular the impression conveyed by the regiments thus moving ahead in phantom silence.

If one has, in Russia, a *penchant* for cavalry of a peculiar species and aims to attain, in so far as may be possible, the extreme theoretical standard, which has been apparently fixed upon, that is an affair with regard to which we would not in so far be lacking in conservatism as to deny that there may be justification, in a degree; though we are by no means enthusiastic for an exaggerated uniformity and are quite clearly of opinion that, without detriment to their appropriate spheres in action, the hussars and ulans may continue to exist along with dragoons, in fact, that the ulans, on account of the lance, *must* continue to exist. If, further, the entire cavalry receive the same firearm, in order that the independence of this arm of service shall not be impaired, that is also a matter, as to which no one can justly find fault. That every troop of cavalry must be in a condition to fight on foot, on occasion, requires no especial demonstration at the present day. But when the dragoons are also to carry a bayonet (!), with the avowed intention of attacking with it on foot, closed in mass, it is not too much to say that an arrangement of this kind must alienate, in no slight measure, even the judgment of the most conciliatory. As a matter of fact, forty-six regiments of horse, the dragoons, are thus armed; with the sabre they are provided with the means for making the bayonet available, and on each and every occasion, when they dismount to fight on foot, they are to fix the latter, to vivify by its moral influence, so we are told to believe, the spirit of the offensive.

That the offensive spirit should not desert the cavalry on foot, is clear, and that the bayonet strengthens the offensive, is also subject to no doubt. But must the dismounted cavalry, in fighting on foot, on the defensive, as also on the offensive, equal, nay even excel, the infantry? Such would certainly seem to be the drift of the reports, which come to us upon the matter, as they dignify such a capacity into especial praiseworthiness. And if, through the employment of the bayonet, such a preponderant value be given to fighting on foot, must not the cavalry necessarily become degraded into a sort of go-between, half cavalry, half infantry, neither one thing nor the other? We have every esteem for the infantry, as the principal arm of all modern bodies of troops, achieving the final decision of battles; but we have no esteem for an infantry, which is at the same time cavalry, or, what is to the same purpose, for a cavalry, which is at the same time infantry, and by which, therefore, it is proposed to represent a composite arm, possessing the peculiar attributes and adaptability of each. To be both with equally preëminent excellence, as much a cavalryman as foot soldier, is simply impossible, even with a vastly lengthier period of service than is everywhere in vogue at the present day in European armies, and though the Russian cavalryman were to remain his full six years with the colors;—the one is inevitably antagonistic to the other. The dismounted cavalryman is only the half of an entirety; what may be required of him on foot, can only be a service incident to occasion, but must not be made the chief end of his being. The future, perhaps, may have in store for us "mounted infantry." But then let it be what it is intended to be, "infantry" which, fully and absolutely organized, instructed, armed, and equipped as such, has learned the further lesson, to make proper use of its horses to the intent of reaching the spot where it shall act as infantry and which shall, at the same time, inspire that respect, which is commensurate with the inherent importance of this arm. To require simultaneously from it the service of cavalry, the closed attack, the making of *reconnaissances*, etc., would be preposterous. For our part, we are scarcely prepared to have much faith, even in such a mounted infantry. Heretofore it has nowhere sufficed for its intended purpose. The few companies of mounted infantry, which the French had created in Southern Algiers (the men rode on mules), were soon done away with; the formations contemplated by the English in the Egyptian expedition of 1882, were abandoned, because, apparently, the requisite *matériel* in horses was not forthcoming. In Southern Africa, where, alone, mounted infantry to an extent achieved results and played a *rôle* of some importance, considerations had weight which have no bearing whatever in the case of our European armies. From childhood, the Boer is as much at home with the rifle, as with the horse. The same remarks have force, to a certain extent, with regard to the cavalry in the American war of secession, especially that of the Southern states, at least with regard to a great portion of its reserves. It was incorrectly denominated as such; the name of "mounted infantry" would have been more appropriate, for of distinctively cavaleristic peculiarities, which would have admitted of its employment in battle, closed in mass, it possessed little. The great raids, which gave it fame, require from the troop itself, as shown by the manner in which these occurred or became developed, nothing more in the way of such cavaleristic peculiarities, than a certain endurance, as well as familiarity with and aptitude for riding, which qualities fall lamentably short of making a cavalryman of the individual in question. If Russia, as it would appear, have taken those swarms for her prototype, she cannot expect in the future other achievements for her bodies of horse than were there attained;[11] nor can there then be question of a stand to be taken by cavalry in dressed files, sabre in hand; and the practicability and utility of successes peculiar to the undertakings of cavalry, properly so called, must be acknowledged by her to be excluded from the limits of the possible.

And,—we report it with reluctance,—it is almost so. True, it is not quite proposed as yet to abandon a contest with cavalry in the open; but an attack upon infantry is regarded as purposeless, for the cavalry would be destroyed, so it is said, ere it could get at the infantry. And for this reason, the bodies of horse are to abandon this thankless field of activity, and are only to devote themselves exclusively to the solution of their other two problems, the strategical service of *reconnaissances* and fighting on foot, in the latter of which, utilizing the rapidity of their horses to approach unobserved, as well as on occasion to disappear with alacrity, they might still have chances. The Russians think of the cuirassiers of Woerth and of Sedan. But bravery alone can certainly not accomplish everything; to success are essential besides courage, prudence; besides gallantry and dash, also reflection and the military eye. In fine, so say the Russians, the few cases in which, in the last wars, cavalry had still found the opportunity to act with energy, had proved beyond the possibility of contradiction that the time of its successful achievements existed no longer. But they lose sight of the fact, so far as 1870 is concerned, that both sides, Germans as well as Frenchmen, only commenced to learn through this war.

Since that time all our efforts have been directed towards the ascertainment of the forms and conditions necessary to be arrived at, under a due appreciation of the altered relations appertaining to the efficiency and tactical requirements of the various arms of service; this one thought is almost exclusively the basis of all our exercises;

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[11] V. the note to the translation of the "Russian criticism" upon this paper, in the *Army and Navy Quarterly*, October, 1885, page 488.—TRANSLATOR.

the successful availability upon the field of battle is the *conditio sine qua non*, the one consideration, without which the cavalry is not worth the money expended upon it, and without which,—as, certainly, beyond all question, it cannot be relied upon to bring about the achievement of decisive issues on foot,—it must deteriorate to the position of a merely auxiliary arm. And as we, so labor also the others: in France, where even now it is proposed to introduce again the lancers and where the cuirass itself has been again included in the equipment of a portion (six) of the regiments, in which it had been discarded; in Austria, in Italy, everywhere the same principles are being acted upon and a new spirit animates the cavalry; in dispositions and regulations suitable to present demands, it is thought the goal in the fulfilment of the most ardent hopes, is being reached—and this with especial regard to the vastly increased efficiency in results attendant upon the infantry combat of the day; and the opportunity is yearningly looked for, in which it may be vouchsafed to put to the test upon the adversary, whether perfection shall have been attained. And in the mean time the Russian cavalry, which, being the most numerous of all, should be the first to strive to equal these ideals, throws the lance to one side and, taking the point, fixes it in the shape of a bayonet upon the muskets of its troopers, so that they may fight *on foot*, neither cavalrymen, nor foot soldiers, because they no longer have confidence in themselves, to horse. The Cossacks, it is true, are still to be mounted in action, as the lance has been left in their hands; but Cossacks in themselves cannot be imbued with tactically cavaleristic ideas, and time out of mind their employment for the closed attack was not to be thought of. Besides, how long will it be till they also shall have lost their old historical weapon? The idea has already been advanced, to rob them of it, for of course it is useless in fighting on foot.

Fighting on foot is to-day to constitute the most notable method of fighting for the cavalry. What it has lost in utility when mounted, it is to regain through so much the greater achievements with the firearm. On foot, it is to shun no adversary, whether in attack, or defense; it is even to attack positions held by the hostile infantry and to drive out the latter at the point of the bayonet. Now it may be granted that a thoroughly excellent cavalry, upon occasion, *when it is imperative,* must not, as a matter of course, recoil dismayed before the duty of capturing and occupying points and defiles, etc., which are defended by infantry. But can it be thence construed that this is intended to apply to the more important conflicts, with the masses of the inimical infantry ranged in line of battle? Having advanced before the front of armies, shall the cavalry, after it has driven back the enemy's horse and comes upon the latter's infantry, attack this also; or shall they go so far as to dismount in battle and, forming battalions, proceed to advance in steady and continuous *fusillade*, shoulder to shoulder with the infantry, against the enemy's lines? The Russians require this. Dismounted cavalry cannot count upon success against infantry, except through its artillery, or through surprise, or through great numerical superiority, and in those cases only where relatively weak bodies of infantry are concerned. With the instant, where the hostile cavalry has disappeared from the scene and ours has encountered the main forces of the adversary, its duties as an offensive arm cease, and these duties, in order to maintain until the approach of our own main body, that which has been accomplished and won, become distinctively defensive. Of a further pushing forward, there can momentarily be no longer any question; one keeps up with the enemy and touches, and feels, and observes, and reports, but nothing more; with force nothing further is to be done, and least of all on foot. To oppose dismounted masses of cavalry to infantry, is already in itself an error for one reason alone,—quite independently of all considerations having to do with their inferiority in appropriate qualities,—in that the cavalry, in view of its diminished numbers, as well as its peculiar situation, must suffer inordinate loss in face of the tremendous advantage possessed by the infantry. For the losses sustained are aggravated by the enormous number of horses and horse-holders, which must inevitably trammel and impress an unwieldy character upon the squadrons to such a degree that their combatant power may well be reduced to a minimum.

The Russians should certainly know this. Or are they of opinion that their 155,000 men make them independent of considerations of this sort? They will acknowledge the reverse, if their cavalry shall really carry out what is required of it. It does not suffice that it shall not avoid a conflict with the infantry, but it must even court the opportunity to bring one on, by seeking out the flank and rear of the latter, dismounting, and then proceeding to the opening of the attack in inverted front,—an order which can never become ominous or prejudicial to it, on account of its horses! And while it would, to be sure, be possible, on occasion, to ride down an infantry disturbed through the threatening of its line of retreat, the fundamental idea is that the contest with fire-arms and the final attack with the bayonet, if less expeditious, lead more surely and readily to the object to be attained, and that the mounted attack should be the exception, not the rule. That the last will actually be the case, we are quite prepared to believe.

A body of troops educated to fight as infantry, will only brace itself to a mounted charge with reluctance. The fight on foot appears to it the least dangerous. But let us now imagine one, two, or three cavalry divisions advancing against infantry in position. Can they in any case look for success? We are of the opinion, that a body of infantry, which can be brought to yield through the appearance of dismounted cavalry, should be forthwith transformed into garrison troops, and, to speak with Frederick the Great, should be shorn of hat-trimmings in disgrace, unless, indeed, the cavalry be tenfold superior to it in skirmishers. To give way before the cutting and thrusting of the squadrons, which attack it in flank or rear before it has time for reflection or to assume formations requisite for defense, may be honorable for the infantry; but to be vanquished in the fight by these squadrons, *when they dismount* is *simply disgraceful.* It is one of those great lies which Napoleon I., not only as man and politician, but also occasionally as a soldier, did not hesitate to hurl into the world, that 3000 dragoons on foot, grow into 2000 infantrymen. The 3000 dragoons are *reduced* to 2000, as it is, as a third must act as horse-holders; and then these remaining 2000 are still only dragoons, and in the true signification of the word, *i.e.* cavalrymen,—not infantrymen, by far.

In many ways, the Russian takes after and affects the Frenchman. What is new exercises upon him an irresistible charm; animated because of apparent progress, he does away with and demolishes old time-honored institutions and labors upon the erection of new ones, until the consciousness is brought home to him that he has built upon sand and that his hopes and fantasies have led him astray. So it is with his social and political relations, and so it is in the army. Once already had he wandered into the same crooked by-paths. But the experience which should have been gained with those dragoon corps of Nicholas I., was fruitless. To-day the cavalry divisions are to be a sort of universal arm. Infantry with the musket and bayonet, cavalry with the horse, they are strongly supplied with artillery, that they may be the better adapted, and in heightened degree, to energetic combat, whether in the conflicts aiming at distinctively decisive results, or otherwise. Indeed, latterly it has been thought that they should not even be deprived of the valuable support of pioneers, that eventually they may be enabled to make available the various means of aid of field fortification. To one of the cavalry divisions (the fourth), a squadron of mounted sappers was assigned over a year ago, and it may well be premised that this example will shortly be followed in the case of the others.

The crucial test as to the efficiency of an arm must ever be independence in every respect. But as this is unquestionably correct, it must have its limits, like every other general rule. Mounted sappers, a handful to a division, for peculiarly technical work on railways, telegraphs, bridges, etc., can render excellent service;—in undue proportions, they become a species of ballast and lead to ideas, which should have and can have nothing in common with the efficient activity of the cavalry divisions. Artillery is essential to secure a proper standard for the combatant power of cavalry; without artillery, the latter must fare detrimentally in all those enterprises devolving upon it, which require thoroughness and that independence which may enable it to sustain prolonged contests; two batteries to a division of four regiments are, however, too much of a good thing. That when at hand in such proportions they would in many cases afford the cavalry the opportunity to dismount to fight on foot, would be no misfortune; but they will as frequently operate to embarrass and interfere with distinctively cavaleristic action and bring about a weakening of the offensive power of cavalry, in consequence of the necessity of detaching from the latter, suitable supports:—if we mistake not, the Russian *règlement* designates two squadrons, as the force to be invariably employed for this purpose. Where the artillery is too strong, it inevitably becomes, in the nature of things, the chief arm, and the *rôle* of the others assumes a subordinate character, being confined to rendering support and affording cover. Detachments of one battalion with one battery, where the infantry is charged with the performance of an independent duty peculiar to this arm, are tactically not to be thought of; detachments of four cavalry regiments with two batteries, only where certain conditions are satisfied. But these latter detachments can least of all be of advantage, where it is proposed to fight on foot, for these four regiments have no skirmishers; and this would be true, even though no mounted reserve or especial assignment of a supporting body for the artillery, were necessary. It is true, it appears to be intended to raise the standard of the cavalry regiments of the guard, and army to six squadrons,[12] but until this change shall have been accomplished, we cannot regard the prevailing relation between the two arms as a favorable one.

The reports of General Gurko,[13] upon the latest strategical cavalry manœuvres, speak of the peculiar and, from a cavaleristic stand-point, the deplorable fact, that on the last day of manœuvre both the contending parties, upon encountering one another at Ananjew, dismounted to fight on foot, without apparently having made even the faintest endeavor to attain a decision through a mounted attack. This is one of those sickly misconceptions, of a false system of greater and lesser tactics, consequent upon unsound views, which have often heretofore been brought to the light of day, when, having in mind a perfectly correct idea, one has allowed one's self to be carried away to illogical conclusions, which lie beyond the domain of the possible.

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[12] Most of the regiments of Cossacks now number six sotnias.

[13] V., for example, the before-mentioned paper of A. von Drygalski, as also No. 84 and succeeding numbers of the first year of the German *Heeres Zeitung*.

But if, with all their predisposition towards fighting on foot, the Russians shall some day attack us, in obedience to an irresistible impulse, or because they shall be led by officers, who have yet remained cavalrymen;—when their united forces of all arms, reënforced by their second and third categories, shall come surging towards us!? Then there will come to pass cavalry battles, such as the world has not heretofore seen; then it must be demonstrated, that not the masses alone can achieve decisive results, but, on the contrary, the spirit which animates them! Victory is not secured by superiority in numbers, but by horsemanlike thoroughness, by the insight, the keenness, the aptitude, the military eye, of the leader. In Russia, our system of instruction is derided, our riding-school training is declared to be exaggerated, our three-file tactics calculated for the place of exercise alone, and the opinion is seriously entertained that their Cossacks and dragoons would soon settle with men like ourselves, *i.e.* with *manège* riders drilled like machines. For our part we cannot relinquish the belief that with our organization, our *règlement*, our instruction, but, above all, with the inherent spirit of our arm, we have taken better counsel than the Russians.

Herewith we have in contemplation the Russian cavalry as it is at the present day; not as it may become in the future, in the event the crooked road, whereupon it has suffered itself to be betrayed, shall be further followed. It is not enough that the traditions handed down from the time of the greatest fame of the cavalry have been broken with; tendencies are exerting their powerful influence in Russia, that would go far beyond the present aspect as we have depicted it, and which, if they prevail, would impose upon the Russian cavalry an exterior that would vividly call to mind the hordes of a Dshingis Khan.

A RUSSIAN CRITICISM UPON "THE ACTUAL AND OSTENSIBLE CONDITION OF THE RUSSIAN CAVALRY."

(Translated from the *Jahrbücher für die Deutsche Armee and Marine* by STANISLAUS REMAK, late First Lieutenant Fifth U. S. Artillery.)

THE paper by Rittmeister von Dewall, contained in the "*Jahrbücher*," entitled, "THE ACTUAL AND OSTENSIBLE CONDITION OF THE RUSSIAN CAVALRY," has, as was to have been expected, called forth a number of adverse comments in the Russian military periodicals. Considering the rather unfavorable verdict which Rittmeister von Dewall has rendered upon the Russian cavalry, it is not matter of surprise that over there in the great Eastern empire his critical opinions are not relished, and that at times there can be observed a disposition to deal with them in a spirit of no great leniency. The severity, as we should rather say, which his observations have encountered, is the more noticeable, in view of the fact that simultaneously with and embodied in the criticism of the work of von Dewall, appears also that of a more flattering verdict pronounced by another writer. This is a paper published at about the same time as that of Rittmeister von Dewall, by the Austrian Colonel von Walter-Walthoffen, in the "*Organ der militär-wissenschaftlichen Vereine*," 1884, vol. xxvii., No. 1, entitled "The Russian cavalry in its latest phase of development, compared with the Austrian," in which, basing his views upon personal observation and detailed studies from original sources, the author reaches a conclusion differing materially from the verdict of Rittmeister von Dewall and calculated to place the Russian cavalry in a far better light. To this fact, of the expression at almost one and the same time of two such opposite opinions from the pens of professional men, is no doubt especially to be attributed the determination manifested on the part of the Russians, thoroughly to controvert the views of von Dewall.

In the following pages we give the Russian utterances with the greatest fidelity and correctness, consistent with the occasional incorporation in our text of the views of Colonel von Walter-Walthoffen, refraining at the same time from any expression whatever of our own opinions. With the presentation of the observations made by the one or the other of the contending parties, it is, therefore, under no circumstances to be understood that we share them. We may say, rather, that we are far from coïnciding in all particulars either with the views of Rittmeister von Dewall, or with the Russian strictures thereon, but have preferred, without comment, to afford a neutral ground whereon the opposing critical contentions may appear and be heard.

The "*Wajennyi Sbornik*" (May, 1884), introduces its remarks upon the work of Rittmeister von Dewall, with the words: "Mr. von Dewall is not acquainted with the Russian cavalry from personal inspection and judges it upon hearsay and the sources which he may have conveniently found at hand; none the less his criticism is very severe and the conclusions to which he gives expression are not favorable to our mounted troops. Fundamentally cognizant only of its organization and numerical strength, Mr. von Dewall derives from the one circumstance—the transformation of our hussars and ulans into dragoons—an opinion upon our cavalry and compares the type of our cavalryman, thus fashioned in his contemplation, with that of the German, naturally according to the latter all preference." In contradistinction to this course, reference is then made to that of Colonel von Walter-Walthoffen, who had, year in, year out, closely followed the activity of the Russian cavalry, not only from personal observation, but also by a careful study of all the printed comments which had appeared, from which, as a matter of course, it becomes evident "that no absolutely groundless accusations or assertions are to be found in his article. And if, here and there, he be in error, he aims in every instance to be impartial and shows a disposition in many respects, to do us full justice." Thus much we premise as to the manner of characterizing the two authors, of whom the last-named discerns in the Russian cavalry a "dangerous adversary" of the Austrian.

As a starting-point for the supervening observations, the Russian criticism selects the article of Rittmeister von Dewall, adding the views of Colonel von Walter-Walthoffen and those entertained at home, "as in the severe style employed in the former, everything happening with us appears to be subordinated to the desire to dwell with especial prominence upon certain individual characteristics." We cannot here continually repeat the text of Rittmeister von Dewall's article, but must confine ourselves to giving the numbers of the pages in referring to especial portions of it. With regard to the introductory remarks up to page 462,[1] the Russian author says that Colonel von Walter-Walthoffen sees no sign of a decay of the cavaleristic element in the distribution of the Cossacks to the regular cavalry divisions, but that, on the contrary, the Russian cavalry had in consequence become better adapted to field service and that the Cossacks had moreover thereby lost something of their irregular character, whether to their advantage or detriment could only be learned through the experience of war. But the dragoons have,—so says von Walter-Walthoffen as opposed to von Dewall—"always rendered better mounted service than the remaining cavalry, and to this circumstance is also in part to be attributed the remodeling of the entire Russian horse into dragoons." His own opinion is expressed by the Russian, Baron E. RAUSCH VON TRAUBENBERG, in these words: "As a matter of fact, the dragoons have never been surpassed by the hussars and ulans in a cavaleristic sense. But the recently accomplished transformation is to be explained by the duties devolving upon the mounted organizations of the present day; not by the assumption that it is proposed to assail the essential spirit of cavalry or practically to give it up as a distinct arm."

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[1] The pages here cited are those of the translation of the original article, in the *Army and Navy Quarterly*, (October, 1885).—TRANSLATOR.

To the polemics of von Dewall, on pages 472–473, with regard to *manège* and field exercise, as also upon the utility of the Russian cavalry horse of to-day, von Traubenberg prefixes the view of von Walter-Walthoffen upon these points, tending to show that while *manège* riding had somewhat deteriorated in Russia, in consequence of the diminished term of service, there had undoubtedly been brought about an improvement in field exercise, to which the distribution of the Cossacks to the regular cavalry divisions and the great percentage of horses of the steppes, unsuited to the purposes of *manège* riding, had notably contributed. The rapidity of the gaits is stated to be not so great in Russia, as in Germany and in Austria; but the method, adopted in Russia, of habituating the horse to labor, had been shown to be fully expedient, practicable and satisfactory in results and in every way worthy of imitation. Von Traubenberg states as his own opinion, that the type of the horse of the steppes, principally available for the mounts of the Russian cavalry, is by no means as von Dewall has fancied it. The race had become conspicuously nobler, the growth of the horse greater, and the whole build had undergone so material a change that an eye not well-practised would experience difficulty in at once detecting the horse of Cossack blood in the remounts; indeed, these horses are not infrequently assigned even to the regiments of cuirassiers, which, for a prototype of this race, would be impossible. The care taken in this matter is evident from the appropriate regulations, in accordance with which "the *manège* gallop and side-steps are required and also exercised in practice, as proof of which the various provisions as to the instruction of the officers, non-commissioned officers and men, therein contained, may be referred to. Star-gazers and runaways undermine the reputation of a chief of squadron, and every possible effort is made to diminish their number." "The view of von Dewall, that *manège* riding forms the basis for field exercise, is thoroughly correct, and this fact has by no means been lost sight of by us. The horse is only sent to the front and into the field, when he has gone through a complete course of training on the snaffle and curb. He takes the gallop, makes side-steps,—is therefore under the control of the rider. Beyond doubt this training formerly went much further, but this was only possible, because the cavalryman served longer and because, at the same time, the ideas then entertained as to the service of this arm differed from those which now prevail." The closed attack upon the field of battle is to-day no longer the only duty devolving upon the cavalry, and for that reason "as soon as the horse shall be in the power of his rider, the exercises of the riding-hall must give way to field exercise, for the *manège* is intended to be one of the means, but not the sole object of instruction." Accordingly these things, in addition to other branches of instruction, are practised during the winter, "with the advent of spring, however, the occupations assume a different character—and *terrain* exercise ensues, whereby we employ the term in its most comprehensive sense." Disposing of the strictures of von Dewall as to the method of saddling with the answer that the imperfections of the present cavalry saddle had also been fully appreciated in Russia, and that a new model is in contemplation, von Traubenberg proceeds to the examination of the remarks of von Dewall on pages 476–480, with regard to "mounted infantry," and the decadence of the cavaleristic spirit in Russia on account of the predilection towards an "infanterization" of their bodies of horse. Although von Traubenberg is of opinion that von Dewall goes too far in his complaints against the Russians, and that these are certainly unfounded if they rest solely upon allegations of the favor in which fighting on foot is held; he yet believes that such complaints must inevitably lead every thinking cavalryman to ask himself the question, whether such a tendency may not actually exist, and further whether an outside observer may not judge more correctly than one who is himself directly on the spot, a necessarily passive participant, powerless to withstand the stress of revolutionizing change, and perhaps by his very surroundings precluded from dispassionate investigation. Von Traubenberg regards this self-testing as the more necessary, inasmuch as von Walter-Walthoffen also advances the views of the Prussian Rittmeister, if in far milder form. The latter is stated to have reached the identical conclusion, that the regulations for the fighting of cavalry on foot go too far and partake too much of the regulations for infantry, and "in consequence a tendency to the too general development of fighting on foot is brought about to the prejudice of distinctively cavaleristic instruction. In many cases (as also in the last Turkish war), fighting on foot is resorted to, where this is not imperatively necessary. By a comparison of the Austrian regulations with the Russian, it will be perceived that the Austrians have fallen into the opposite error, while the Prussians hold the golden mean." Further elucidating his thought, von Walter-Walthoffen says: "Thus the Austrian cavalry has remained far behind the Russian in the matter of fighting on foot, while the German may readily enter upon such a contest with the latter; the Austrians should here tread in the footsteps of the Germans." The question as to whether Russia is moving within appropriate bounds in this respect, or not, von Traubenberg refrains from deciding; but he strenuously combats the view that the Russian cavalry can be regarded as "mounted infantry," and for himself individually denies both the applicability of the parallel, by which it is likened unto the "American cavalry," as well as the intimation that the latter is held forth as a pattern, the more as in Europe one has to do with regular cavalry.[2]

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[2] In contradistinction to the rather severe judgment of Rittmeister von Dewall upon the activity of the American cavalry, it may interest the American professional reader to learn that in a recent paper in the "*Jahrbücher für die deutsche Armee und Marine*," (July, 1885), entitled "Recent developments in the Russian cavalry," by A. VON DRYGALSKI, (an acknowledged authority upon the subject, with regard to which he has published a number of communications), reference is made to a scientific gathering of Russian military men, at one of whose meetings the importance of greater enterprise in partisan warfare, as carried out in the American war, was urged and at which the fact, then alleged, that the Americans had copied their raids from the Russians, was apparently dwelt upon with especial satisfaction. These scientific military gatherings have been instituted at St. Petersburg by the officers of the general staff, there stationed, and are participated in by the Grand Dukes. On the evening in question, after a discourse by Lieutenant Colonel Baron "R. v. T." (RAUSCH VON TRAUBENBERG) upon "The views of recent German military writers upon the *rôle* and activity of modern cavalry," Colonel SSUCHOTIN, Professor in the Academy of the general staff, a recognized authority on cavalry, at the solicitation of the Grand Duke Nicholas (the senior), made some remarks, in which occurred the reference above mentioned and in which he "emphatically declared his opinion, that the Russian cavalry, as regarded the peculiarity of its organization, education, instruction, armament, equipment and readiness to fight, mounted as well as on foot, had vastly outstripped the other European armies; and though, at first, the Russian reforms in this respect had engendered doubt, they had now called forth the desire to imitate them." After referring to the especial availability of partisan enterprises and raids in hindering the mobilization and concen-

The opinion intimated by von Dewall, that the Russians in depriving the Cossacks of their lances, had robbed themselves of the last remains of their cavalry, von Traubenberg is not disposed to share. "The lance is emphatically not an absolute condition demanding to be satisfied, in the armament and equipment of the cavalryman; in the fatherland of Seydlitz it is carried only by the ulans, but does that signify that the remaining bodies of horse are contaminated by a spirit tending to give them the predominant attributes of infantry? In any case, the use of the lance is confined within narrow limits. Its defenders principally advance in their favor, always the one argument only: the moral effect upon the infantry. And while this undoubtedly becomes desirable in the closed attack, it must be remembered that the Cossacks would be employed for such duty on comparatively rare occasions, so that the lance is not really necessary to them; on the contrary, it is frequently quite detrimental in this method of fighting; and, finally, it should be remarked that many of the Cossack Woiskos, as those of the Terek, the Kuban and others, never have had the lance, nor have it now."

With regard to the second part of the work of von Dewall,—as to the conjectures upon the manner in which the Russian cavalry may propose to carry out its strategical activity,—the Russian author complains that here von Dewall again starts with the erroneous assumption that instruction with a view to fighting on foot is dignified as of primary importance and that for this reason the cavalry divisions had been so plentifully supplied with artillery. The concluding paragraph on page 483 of the work of Dewall containing the reference to the hordes of Dshingis Khan, draws forth the remark: "this severe tirade shows on the one hand little knowledge as to the Russian arrangements; then, on the other, it sounds unduly inspirited by a patriotic sentiment, which is little calculated to further the behests of a calm weighing and inquiry as to the subject-matter; the views expressed, demand, moreover, logical demonstration." Premising that the cavalry of to-day has a double duty to fulfil, namely a strategical and a tactical one, von Traubenberg says as to the first of these services devolving upon it, that this necessitates a lengthy separation of the cavalry, dispatched

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tration of the enemy, latterly so notably accelerated, Colonel Ssuchotin insists that "the cavalry must, however, be able to fight equally well, whether mounted or on foot, nor regard a ride of 400 versts as anything extraordinary." The comprehensive discussion of the subject of partisan warfare, as treated, among other writers, by F. Gerschelmann, in the "*Wajennyi Sbornik,*" 1884 and 1885, is stated to be in the same vein.—Translator.

to great distances, from the other troops, and makes it dependent upon itself and its own resources. To be enabled to carry out this *rôle*, the cavalry must possess a relative degree of independence and, for this reason, instructed by the experiences of the later wars, all the great European powers had armed their bodies of horsemen either with carbines or with muskets, to enable them in individual cases to act without the support of infantry and, here and there, even to take the place of the latter. The assignment of horse artillery to the Russian cavalry divisions is based upon the presumption as to the requirements of the latter in mounted conflicts and is perfectly consistent with the organization of the regiments into four squadrons and still more so in the case of those having six; to base the strength of the artillery upon the number of men dismounted to fight on foot, had least of all been sought after. It must also be superadded that the Russian horse artillery is preëminent for remarkable mobility, decision, and intrepidity and can, therefore, never become a burden to the cavalry.

Remonstrating against the disposition of von Dewall, to allow neither traditions nor the true spirit of the arm to the Russian cavalry, von Traubenberg—remarking that its past achievements had probably not been less glorious than those of the cavalry of the descendants of Seydlitz and of Zieten—states that "the rare instances advanced by the author in support of his adverse comments upon the arrangements for dismounting, have reference to manœuvres, and do not, therefore, really require serious contradiction at the present time. The sabre has not been consigned to oblivion by the dragoons; they are ever prepared for attack with this weapon."

Colonel von Walter-Walthoffen diverges in his views from those of Rittmeister von Dewall. The cavalry divisions have, as stated, the same duties assigned to them in Austria as in Russia. Yet there, there is no fixed distribution of cavalry to the infantry division, which rather has cavalry assigned to it as necessity may arise, and thus it happens, according to the opinion of von Walter-Walthoffen, that the employment of the cavalry in Russia is not always a correct one. The reserve cavalry (the stronger masses of troops), which comprehends all the available cavalry divisions with their artillery, has the definitive problem before it, to hinder the breaking through the line of battle by the enemy, as also to afford time to the troops to occupy new positions; but, besides, it is to execute the last decisive stroke against the unsuccessful antagonist, or, in the event of disorder among the home troops, to rescue and hew them out of such ominous predicament. Here and there the reserve cavalry can also be employed in operations against the flank and rear of the adversary, even on foot; and it indeed seems as if great weight were accorded to active enterprises of this sort, and as if it were contemplated frequently to resort to them. As to the above expression of von Walter-Walthoffen's views with regard to the duties devolving upon the various Russian bodies of cavalry, von Traubenberg remarks: "Although Mr. von Walter-Walthoffen has studied the official instructions, relating to the active employment of our horsemen, he falls into the same error as Mr. von Dewall in reference to the operations of great masses of cavalry against the flank and rear of the enemy. Without investigating the sources in which the two German writers have searched, we merely observe that such a proceeding is nowhere officially recommended with us, and that therefore, where it may be resorted to, the reason must be sought for in the individual judgment of the commander as to the necessities of the situation." Theoretically developing this question, von Traubenberg reaches the conclusion that "the valuable peculiarity of cavalry—its rapidity—must be taken advantage of, but nevertheless, a methodical attack on foot must not be thought of where the division has shrunken to dimensions approximating two battalions, for then, as a matter of course, even relatively equal excellence being pre-supposed, it can prove no match for the infantry, and we also act accordingly."

In so far as the Russian article has reference to that of Rittmeister von Dewall, we should here have come to an end. But owing to the fact (because, as we believe, our communication thus gains in interest) that we have also drawn the views of Colonel von Walter-Walthoffen within the sphere of our observation, let it be permitted to repeat here the concluding verdict which the latter renders upon the Russian cavalry. He says: "In general we find in the Russian cavalry and especially in the Cossacks, a very earnest, enduring, mobile, untiring, and shrewd adversary. The standard of the mental training and culture of the officers becomes heightened with each year, and the number of those officers who have enjoyed the opportunities for suitable preparation and study grows apace." "Thanks to the recent transformations," we read further, "the Russian cavalry has become peculiar to itself and there is shown in it a greater tendency towards activity on foot than in the cavalry of the other great powers. It cannot be denied that the distribution of Cossacks to the regular cavalry has called forth, or at least developed, a greater mobility and greater aptitude for outpost service and the service of *reconnaissance*, while, in consequence, on the other hand, an exceedingly favorable influence is also exercised upon the Cossacks.

"In the changes introduced into the regulations, the idea of a greater capacity for manœuvre of the cavalry, adapted to recent demands as to its tactical employment, has been carried out. The organization of the Cossacks after the manner of the dragoons and their incorporation into the regular cavalry divisions, materially increase the strength of the cavalry.

"With regard to the theoretical and practical occupations of the officers, the strenuous efforts made to prepare them thoroughly for the severe duties of service before them, are noteworthy. The view entertained by many that the re-organization of the Russian cavalry has transformed it into 'mounted infantry,' is absolutely groundless. The cavaleristic element has emphatically not been lost there. On the contrary the last campaign has shown, that not only in the regular, but also in the irregular, Russian horse, there existed a spirit of enterprise, which became manifest and led to the best results, whenever the leaders understood how to awaken it and make it available.

"Though it be true that the Russian cavalry had then to do only with an inimical cavalry of no great excellence; yet if in the future, it shall be called upon to take the field against active and enduring bodies of horse, well organized, armed, equipped and instructed, it will be demonstrated whether the practical application of the tendency to assign greater importance to fighting on foot than heretofore, has been prejudicial to cavaleristic peculiarities, or not."

Connecting the close of our communications with the beginning, *i.e.*, with the Russian criticism upon the work of Rittmeister von Dewall, it should be added that von Traubenberg designates the author as an officer of esteem in his domain, who has a right to speak with authority, and who, though not free from prejudice against the Russian cavalry, has yet developed such an abundance of interesting observations upon the importance and activity of the cavalry, as to entitle him to recognition as conspicuously conversant with and a lover of his arm.

THE MORAL ELEMENT IN MILITARY DISCIPLINE.

[We make the following extract from a lecture entitled "Drill or Education?" delivered before the Military Science Society of Vienna by Lieutenant Field-Marshal the Archduke John. It was translated from the German for the Journal of the Royal United Service Institution by Captain W. A. H. Hare, R.E., D.A.Q.M.G.]

A DISTINGUISHED general once said to me that when he was commanding a Hungarian regiment in the Italian campaign he was asked whether he could rely on his men, and he felt he could answer that they would certainly do their duty for the sake of their colonel. And this proved to be true. The affection of men for their commanding officer can do great things, but it must be more than mere sympathy, it must be an affection amounting to a devotion of the most completely confiding and self-sacrificing nature. To be able to gain an affection *of this kind*, however, is not the gift of all, for a good disposition and study are not sufficient; popularity-hunting will never do it. We must have a fellow-feeling for our subordinates, and then only can we gain their hearts. But to display this fellow-feeling only will do no good. You will never win the hearts of men unless your heart is really with them. Unfeeling men are to be avoided just as those hypocrites who are cunning enough to feign a fellow-feeling. They are left in the lurch the moment the game they are playing is laid bare, and they are then the more hateful as we feel they have deceived us. Ordinary individuals have far greater instinctive powers of discernment in these matters than most people give them credit for.

It might be urged by those who object to these principles that it would never do if a regiment would only follow Colonel A and not Colonel B. And it would certainly never do; but the other kinds of moral motive-power which I have alluded to, insure troops doing their duty under any leader. If, however, our aims are higher than this, nothing but personal influence can attain them. Rustow is perfectly right in saying "the influence of a commanding officer does not arise from chance or accident. He who can get more from his men than can his opponent from his, is always at an advantage."

An Austrian author, describing the habit of discipline in the observation of certain forms as the only means at our disposal, says literally, "It is a myth that in the rapid conversion of our human material so-called beloved leaders arise, round whom men rally with devotion in the hour of battle." Now, to those who know troops by personal contact, and have a fellow-feeling for them, there is, thank goodness, no myth about it whatever. Affection is a thing quickly acquired, but habit is a matter of time. If the rapid conversion of our human material is dangerous to one of these, then I should say that habit is most likely to suffer in this respect. The filling up of the ranks with the reserves, the marches for concentration, and the first, though perhaps ever so small, engagement, are enough to make a commander liked or disliked by his men. Ay, it only requires a moment or so in the hour of danger for a really first-rate man to gain the affection of his inferiors.

One of the most important conditions, and at the same time a useful lever for morally improving the soldier, is *the relation that exists between officer and man.*

This relation is in certain armies based on tradition. Based on conditions that have still something patriarchal about them, and the social standing of the subaltern officers, it is in Russia far more direct and intimate than in other countries, and is, perhaps, too familiar. The Prussian officer, as we all know, having a social standing of the first rank in the country, moves in the best society in consequence, and being represented with his men by excellent non-commissioned officers, is brought far less in contact with them, in fact, his relations with them are almost of a purely duty nature. With us the relation varies very much in the different branches of the service according as the officer lives more or less in close contact with the men.

But on the whole we might observe that, having due regard to the peculiarities of the majority of nationalities in our army, the relation might with advantage be a closer one in the infantry.

The soldier should, in fact, be looked on as a man, and what is more, be made to feel as a man. The officer need not be always on duty from his point of view. Without causing any undue familiarity he can, by daily intercourse with his men, get opportunities, while fully maintaining his position, of showing himself in the light of a sympathizing fellow-creature instead of the mere superior, in caring for their interests and doing all in his power for their material welfare.

If the bonds between officer and man be closely drawn, the former ought never to find it difficult to arouse, without the use of empty phrases, in a way that suits the individual character of the man, such qualities as love for king and country, pride in himself as a soldier, ambition, *amour propre*, a soldier-like feeling of obediencé from self-conviction, and a feeling of *camaraderie* and attachment to his regiment. No stone should be left unturned to raise the tone and feeling of the soldier. We can well afford in this to be a little indulgent in insignificant matters; we must not think it serious if regimental feeling goes so far as to make the soldier look down upon other regiments; give the soldier if possible recreation at the right time; put up with his light-heartedness, and even turn it to account,—*and above all things take care not to get into the habit of continually finding fault*, rather bestow praise, even if it is only half due. Approbation is better than blame; it is the indispensable forerunner of *amour propre*, attachment, and cheerful labor. Constant finding fault produces, by the blunting effect it has on the feeling, the most difficult evil to get rid of—apathy.

The officer should have all those moral qualities we look for in the soldier in a higher degree. We have to produce military characters, independent, cheerfully energetic, and thoroughly conscientious men. Though many may look on converting soldiers into machines as a preparation for our next war, the intelligent man will look for it more by fostering their *individuality* and *initiative*. For the shorter the time the fight lasts, the greater is the necessity for seizing opportunities without waiting for orders. The more murderous the fire, the more questionable is the possibility of giving orders, and the more frequent the loss in commanding officers, whose regiments, however, cannot stop in critical moments to have the command taken over. The greater the friction, the more is it desirable to have, instead of a machine-like army, a living organism, the parts of which can act independently in the spirit of the general desire.

It would appear, therefore, all the more desirable that the higher leader should, instead of making his subordinate officers go in leading-strings, direct them intellectually, and so fashion their ideas that he may confine himself to ordering what is only absolutely necessary, and leave the remainder to the initiative of his subordinates, feeling sure that though they may not act strictly in accordance with his orders, they are certain to act in accordance with his intentions. This, again, requires the relations between senior and junior officers to be of the closest kind; to communicate our own ideas and convey our own ways of thinking to others is only possible with close personal contact. There are some colonels and generals who keep almost quite aloof from their officers; very often this arises from an unfounded fear on their part that close contact with juniors is likely to affect their dignity. But the man who is firm in the saddle as a member of the military hierachy feels no necessity for surrounding his person with obstacles to approach, which after all afford a very poor protection to the authority belonging to the *rank* only and not to the *person*, against the skepticism of juniors. A colonel or a general should have the courage to be a friend and comrade off duty.

But when the increased demand for independent and self-relying officers has been alluded to, it has been sometimes met with the question whether independence did not already exist, and only required to be tolerated? No! unfortunately it must be cultivated, for there are too many of our juniors whose minds are dull and without desire, who are only too glad to be relieved of all responsibility by the guardian of inactivity; and the lethargy which is the consequence lasts long after the original cause has been removed. Let every one be given the full free scope allowed by the spirit of the regulations, and let us trust to the responsible spontaneous action of our juniors. We must satisfy ourselves beforehand, however, by the strictest tests, that what is required is likely to be forthcoming, and distinguish between the criminal presumption of the impostor and the proved and consequently esteemed conscientiousness of the reliable man.

Everything that the junior does *cannot always be improved on.* Many an error in execution or even in resolution may be overlooked in order that power of resolve and self-reliance may not be interfered with. We should never let ourselves be influenced by temper or passion, and never color the meaning of others. The eye-servant who tries to curry favor should never be encouraged, nor should the honest man, who, rather than try to ingratiate himself, makes himself perhaps disagreeable, be snubbed. This is the way to produce military characters, otherwise we shall only produce slaves, who in the choice of "to be" or "not to be" purchase the "to be" with the surrender of their individuality, at first, perhaps, against the grain, but gradually with their moral emasculation appeased.

The officer must be naturally inspired by an ideal conception of his profession. He will thus be proof against the attacks of materialism, and encouraged to face the trying duties of his calling.

Let the officer remember that if he can oppose a living dam to the flood of the

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disorganizing tendencies of our days, these will break helplessly on the soundness of his strength of character. Let him acquire a pride in himself from the thought of the meritorious work he has done in yearly instilling into the minds of the one hundred thousand men or so that annually join in the colors, a higher moral tone, a love of justice and order, and feeling and character,—in fact, the blessings of civilization which they take with them to their distant homes, to there produce further benefits. The officer thus fulfills in peace a mission just as noble in itself as is his bloody work in war. Let our officers be firmly convinced that in days when opposite disuniting efforts are tending to undermine the monarchy, it is the officers' duty to strengthen to their utmost the bonds that unite it, by instilling into the minds of the thousands that come from all parts of our wide empire a feeling of unity in the whole Fatherland, and the desire to raise the national colors high above the petty strife of faction and party, remembering the noble words of the poet, "Austria is in the camp."

Let the officer fully understand his position; let him raise himself above the ordinary level of moral courage, so as to be, in the closest sense of the term, the *soul* of his men, and lead them to victory. But the soldier, if the call or even the example of the officer is to have any effect, must be susceptible and attached to him.

"Rubbish," I hear again the opponents of these ideas exclaim with a cold scornful sneer. Well, may they never be taught by disaster that troops that are drilled only and not educated will fail them in the hour of trial; may they never have to feel in the bitter hour of defeat what a difference there is between possessing and not possessing the affection—this supposed myth—of their men.

And now enough!

In view of the possibility of the monarchy having, at some not very distant date, to engage in a serious conflict, the traditional patriotism of the Austrian army must and can imperatively call upon every man belonging to it, no matter what his station be, to take the most complete *loyal faith* as his sole guide, and follow the line which most surely leads to success.

There can be only *one right* way, for there is only one kind of truth. But it is difficult sometimes to find and recognize it; hence different views, different faiths.

Supported as I am in my belief when I think of the many high-minded and great men whose wise and reforming doctrines have led me to my present conviction, and when I call to mind how often many excellent troops of our army, though undrilled, have shown the highest discipline in the dark days of misfortune, and by their spirit and moral strength have given the most unmistakable proofs of the greatest devotion, I will preserve unimpaired *a belief in men, a belief in my ideal, and a belief in the way in which it is attained.*

The meaning of this belief is contained in the—

ANSWER TO THE TITLE OF THIS LECTURE.

Let us not merely drill, let us educate.

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